UA researchers trace bat killer's path

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This is a little brown bat with White-Nose syndrome. Credit: Jonathan Mays, wildlife biologist, Maine Department of Inland Fisheries and Wildlife

As North American bats face a death toll approaching 7 million, University of Akron scientists reveal new clues about their killer, White Nose Syndrome, or WNS. The UA researchers reveal that the deadly WNS fungus can likely survive in caves with or without the presence of bats and threatens the regional extinction of North American bats.

This discovery casts a gloomy forecast for the curious flying mammals,

which serve as critical food plant pollinators and offer important information used in medical research, particularly as it pertains to blindness. But there is an ecological consequence to bat extinction: a single bat can eat thousands of insects in a single night. Bats are critical to controlling bugs that threaten agriculture and forestry; their pest-control value to the economy is estimated in the billions of dollars.

Researchers seek clues

The UA research identifies cold-loving, cave-dwelling fungi closely related to WNS, and where and how they spread, and how they survive. These findings help predict the future of North American bats —among them—the common Little Brown Bat, first seen with WSN in Ohio in March 2011.

Led by Hazel Barton, UA associate professor of biology and recognized as having one of the world's preeminent cave microbiology labs, the research points to a group of fungi related to WSN, which appears as a white, powdery substance on the muzzles, ears and wings of infected bats and gives them the appearance they've been dunked in powdered sugar. Since it was first discovered in hibernating bats in New York in winter 2006-07, WNS has spread across 22 states, including Ohio. In Vermont's Aeolus Cave, which once housed 800,000 bats, WSN wiped out the hibernation den's entire population.

In their research paper, "Comparison of the White-Nose Syndrome agent *Pseudogymnoascus destructans* to cave-dwelling relatives suggests reduced saprotrophic enzyme activity," published Jan. 22, 2014 by the *PLOS ONE*, Barton and UA post-doctoral fellow Hannah Reynolds compare two closely related fungi species and reveal common threads, including the discovery that the related fungi share the same nutritional needs. Originally satisfied by cave soil, the fungus' nutritional source has now transferred to bats. Barton and her colleagues are zeroing in on

when the fungus transferred from environment to bat and the consequences of the fungus' relentless ability to survive solely in caves, uninhabited by bats.

Longterm repercussions

Dr. Hazel Barton, associate professor of biology at the University of Akron, and her research team reveal new clues about White-Nose syndrome. Credit: Pat Seiser

"The jump from the environment to the bat has come at the expense of

some ability for Pd to grow in the environment, but not entirely," says Barton, who adds that the fungus still retains enough function to grow exclusively in caves in the absence of bats.

"The ability of the fungus to grow in caves absent of bats would mean that future attempts to reintroduce bats to caves would be doomed to failure," she says.

Ongoing research in Barton's UA lab continues to examine the sustainability of WNS to help determine the future of bats amid the deadly disease.

Provided by University of Akron