

Scientists unravel the mystery of white-nose syndrome

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The mysterious disease that has killed more than 90 percent of wintering bats in some caves and mines from Vermont to Virginia during the last three years has raised numerous questions about the nature of the disease and how to control it.

Leading experts in the fields of bat physiology, fungal ecology, ecotoxicology, [disease](#) and environmental modeling, among others, will gather at a workshop at the National Institute for Mathematical and Biological Synthesis (NIMBioS), June 29-July 1, at the University of Tennessee, Knoxville, to explore the disease and to develop solutions to manage it. Representatives from relevant state and federal agencies and other organizations will also attend.

The affliction has been given the name White-Nose Syndrome (WNS) due to its distinctive white fungus growing on the muzzles and other body parts of infected bats. More than a half million bats have died in the last three years due to the disease. Although the cause is unknown, the pathogen is most likely a cold climate fungus. Scientists do not know if the fungus is the sole cause of the bat deaths, or if it is merely an opportunistic pathogen, taking advantage of immune systems weakened by another biological or chemical agent.

It is unclear how WNS spreads, but it is likely transmitted from bat to bat. Other evidence suggests that humans transport the fungus from infected sites to clean sites on clothing and equipment.

The purpose of the meeting is to determine the present knowledge of the disease and to develop predictive models to determine how and under what conditions the disease might spread. Ultimately, the models would be used to help devise appropriate management strategies for controlling it.

Tom Hallam, workshop co-organizer and professor of ecology and [evolutionary biology](#) at UT Knoxville, said so far two management strategies have been proposed to contain the spread of the disease. The first is to eliminate human activity in the caves, which has already been implemented in the eastern U. S. The second proposed management scheme involves heating portions of cave hibernacula to help conserve the bats' energy reserves during arousals from hibernation so as to discourage the bats from leaving the cave to look for food before the spring. The disease disturbs the bats' hibernation patterns, thus causing the bat to become severely underweight.

"However, neither of these strategies has been seriously looked at from a scientific point-of-view," Hallam said.

Gary McCracken, workshop co-organizer and professor of ecology and evolutionary biology at UT Knoxville, said that some bats appear to have a resistance to the disease and that native bats in Europe appear to be immune to it. Both aspects need further investigation, he said.

"It does not kill all species. In affected species, roughly 5-10 percent survive, which is a viable survival rate. Given that there is evidence of resistance to the fungus and that it is not pathogenic to native bats in Europe, the potential exists that its spread is self-limiting," McCracken said.

Eating up to two-thirds of their body weight in insects over night, bats help keep insects under control, ultimately reducing the quantities of

insecticides used on crops. Bats also play an important ecological role in plant pollination and seed dissemination.

In April, the U.S. Forest Service issued an emergency order to close caves and mines in 33 states for up to one year, while scientists work toward learning more about the disease. In 2009, WNS spread south from New England into West Virginia and Virginia and now threatens to spread to the Midwest and Southeast. The Great Smoky Mountains National Park has also closed all its caves to the public, although evidence of the fungus has not been found in the park.

"Modeling WNS in [Bats](#) at the Individual and Colony Levels: Epizootiology and Management" will be a NIMBioS Investigative Workshop. NIMBioS Investigative Workshops involve 30-40 participants, of which about half are invited. Individuals with a strong interest in the topic can also apply to attend.

Source: University of Tennessee at Knoxville

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