

More accurate, sensitive DNA test allows early identification of fungus causing WNS

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Even after researchers studying White Nose Syndrome (WNS) established that a fungus called *Geomyces destructans* is at the heart of the devastating disease, detecting it depended largely on finding dead or dying bats.

This month, the journal *Mycologia* will publish research by a team of U.S. Forest Service scientists and partners identifying additional species of *Geomyces* and describing development of a highly sensitive DNA-based technique for early identification of *Geomyces destructans* on bats as well as in soils and on [cave walls](#).

"The significance of the Forest Service's recent research will have an immediate and direct benefit to WNS response at a national scale," according to Katie Gillies, imperiled species coordinator at Bat Conservation International. "This will allow managers to sample soil and substrates to test for the presence of *Geomyces destructans*, freeing up limited surveillance funds and time. Additionally, this opens the door to examine the use of gene silencing as a [control mechanism](#) for this devastating fungus. Research like this, that directly benefits [resource managers](#) and guides us to controlling this fungus, is critically needed."

Daniel Lindner, a research plant pathologist with the Forest Service's Northern Research Station, led research that identified 35 species of *Geomyces*, more than doubling the number of known species. Lindner and partners used that research to develop a DNA-based detection test for *Geomyces destructans* that is much more sensitive and accurate than previous tests. Forest Service scientists collaborated with the U.S. Geological Survey and the University of Wisconsin for both studies.

"At best, only 5 to 10 percent of [fungal species](#) on earth have been named and scientifically described," Lindner said. "Developing a specific test for this fungus was difficult because we found

that every sample from bats and caves contained a huge diversity of unidentified, unnamed [fungi](#), and these were interfering with detection."

White Nose Syndrome was first identified in Upstate New York in 2006. Since then it has spread to caves throughout the East Coast and killed millions of bats, and it continues to spread.

"White Nose Syndrome is arguably the most devastating wildlife disease we've faced," said Michael T. Rains, Director of the Forest Service's Northern Research Station. "Forest Service scientists are conducting research to halt this disease and save bats, which are so important to agriculture and forest ecosystems."

Scientists identified *Geomyces destructans* as the cause of WNS in 2012. Conclusively identifying the fungus either on a bat or in soil has been difficult and time consuming because a variety of closely related *Geomyces* species found where [bats](#) hibernate have the potential to cause false positives using previous DNA testing. Previous tests also lacked sensitivity, making it possible to miss the fungus in some samples. The new test is 100-times more sensitive than previous tests and can detect a single spore of the [fungus](#).

More information: "Bat white-nose syndrome: A real-time TaqMan polymerase chain reaction test targeting the intergenic spacer region of *Geomyces destructans*" is available at: www.nrs.fs.fed.us/pubs/42974 "A culture-based survey of fungi in soil from bat hibernacula in the eastern United States and its implications for detection of *Geomyces destructans*, the causal agent of bat white-nose syndrome" is available at: www.nrs.fs.fed.us/pubs/42973

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