ScienceWatch – The Extinction of Bats

"This is one of the worst wildlife crises we've faced in North America." – W. F. Frick.

Bats in the Northeast are facing an epidemic of such huge proportion that the most common bat species in North America, the little brown bat (*Myotis lucifugis*), may go extinct in just 16 years. That's the conclusion of a study published in the August 6, 2010 issue of *Science*.

The authors of the study led by Boston University biologist Winifred F. Frick analyzed data on bat population trends over the last 30 years. They also looked at recently escalating mortality data. The disease, known as **white-nose syndrome** (WNS), is responsible for upwards of 99% mortality rates in bat populations and was first observed in a cave near Albany, New York in February 2006. During a routine census, researchers discovered many dead bats in four caves. In one cave the number of bats was only half of what it was the year before. Many bats—both dead and alive—had a white fungus around their nose and on their ears and wings. The newly discovered cold-loving fungus, *Geomyces destructans*, grows on the exposed tissues of bats hibernating in the winter. It seems to irritate the bats, causing them to wake up, leave the cave and fly around. As a result the bats lose body fat and are unable to last the winter.

The researchers looked at bat population records gathered by New York and Pennsylvania state officials and determined long-term trends before the onset of the disease. They then inserted the recent mortality data they collected and, depending on the severity of the disease over the next one hundred years, came up with five models for bat population future growth or decline. Even the most optimistic projections predict that the bats will be extinct by the end of the century. Their data "paint a grim picture of a once-healthy population of an abundant and widely distributed species now experiencing unprecedented losses from WNS …" "If mortality and spread continue the way it has in the past four years, that's where we get the very distressing prediction of a high chance of regional extinction in 16 to 20 years," says Frick. At least six other bat species are also in jeopardy.

The fungus has also been found in European bat populations. In March 2010 a spotted mouse-eared bat (*Myotis myotis*) covered with fungus was found in a French cave. DNA typing showed that it was also *G. destructans*, and it was found on bats in three other European countries.

However, in contrast to what is happening in North America, European bats are not killed by the fungus. "The astonishing thing is that [the fungus] affects North American bats so

devastatingly, but that European bats can get along with it", says Christian Voight, a Berlin bat physiologist. This fact, say scientists, makes it likely that European bats have lived with the fungus for a long time and are resistant, while naïve North American bats are being killed by it. Furthermore, they say that the fungus was probably carried from European caves to American caves by people. In response to that likelihood many U.S. and Canadian caves have been closed to spelunkers so as to try to slow the spread of the fungus.

Little brown bats eat huge numbers of insects and have been known to roost in colonies of 100,000 or more. A 0.5-ounce bat can eat 1,200 mosquitoes in an hour, and can consume its own body weight in insects each night it feeds. This means that a colony of 100,000 bats can eat an astonishing 3,000 pounds of insect pests each night!

A popular television series, "Life After People", discusses how the earth would change (mostly for the better) if humans just vanished. That's unlikely to happen, but the extinction of bats is a looming reality. If it happens, cases of mosquito-borne diseases like West Nile and St. Louis encephalitis will rise, and food crops will shrink from the increased onslaught of crop-infesting insects. Even the Federal government is worried. During a joint House subcommittee hearing on WNS in 2009, Arizona congressman R.M. Grijalva said, "What we know is that bats play an important role in the ecosystems within which they are found. We also know that in the Northeast, shocking numbers of bats have been dying, and the disease is spreading."

We have only just begun to understand how important bats are in controlling insects. Their loss would be disastrous.

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