Agriculture

Fatal fungus hits brown bats

With bat populations decimated, their role as a natural pesticide is threatened.

By Joe Castaldo

Next spring, huge numbers of bats won't awake from hibernation. A fungus called white–nose syndrome is set to decimate bat populations in Canada, and that could have a significant effect on agriculture. The fungus is already driving at least one species to extinction in the U.S., where it was first detected in 2006. It turned up in Canada this year when the powdery substance was seen dusting the noses and wings of bats in a few caves in Ontario and Quebec.

"In March of 2011, you go to those sites, you're going to be knee deep in dead bats," says Brock Fenton, a biology professor at the University of Western Ontario. The die–off could be a looming problem for agriculture, as the flying mammals act as a natural pesticide, eating at least half their body weight in insects every night. Many of those insects, such as moths and beetles, feed on crops. Fewer bats mean farmers will have to use more pesticides, and bear the higher costs.

Much about white–nose syndrome — where it came from, and what exactly it does to bats — is unknown. The fungus affects six species in North America, thriving in the cold environments in which bats hibernate. One theory is the fungus irritates or dehydrates the bats as it grows on their bodies, causing them to wake up rather than hibernating through the winter. That consumes a lot of energy, and soon they have to feed. With nothing around to eat in the winter, the bats starve to death.

A recent paper in the journal *Science* estimates the fungus could entirely kill off the most common species, known colloquially as little brown bats, in as little as 16 years in the northeastern U.S. That trend is likely to repeat itself as the fungus spreads across the rest of the

U.S. and Canada. "It's going to take a long time — if ever — for these bats to recover from white–nose," says Thomas Kunz, a professor of biology at Boston University, and one of the paper's authors.

The fungus has already killed roughly one million little brown bats in the northeastern U.S. in four years, which would have eaten 492 tons of insects. "Extrapolating from that knowledge," Kunz says, "there's going to be a very serious impact on agriculture and forestry over the next several decades." Attaching a dollar value is difficult, however. Only one study has calculated the economic impact of bats on agriculture, and it focused on a specific area of Texas and on a species not affected by white–nose. Nevertheless, the impact was large, with these bats saving farmers up to US$1.7 million in annual pesticide costs.

In Canada, determining the effect is even more difficult because our knowledge of how many bats there are in the country is sketchy. "We may find out the hard way just how much good bats were doing for us," Fenton says.

The prospects for stopping the fungus are bleak. Researchers are instead determining whether some bats in the affected species are resistant to white–nose for breeding purposes. That's one of the tasks University of Winnipeg associate biology professor Craig Willis is working on. "If these traits are inherited, we might have some hope that populations can rebound," he says.

Unfortunately, the answer won't be known for a while, and with a mortality rate as high as 97%, the fungus may clean out bat populations by that time.