

Canine distemper virus: An emerging disease in rare Amur tigers

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Rare Amur tigers in Russia are succumbing to infection with canine distemper virus (CDV), a pathogen most commonly found in domestic dogs, according to the authors of a study published in *mBio*, the online open-access journal of the American Society for Microbiology.

Pressure from poaching, decimation of their prey base, and [habitat fragmentation](#) have diminished the population of Amur tigers (also called Siberian tigers) to fewer than 500. In the study, a team of scientists from the US and Russia show that CDV infected and caused fatal neurological disease in members of this critically endangered species. They estimate that the virus has killed at least 1% of Amur tigers since 2009.

"Losing 1% of an endangered population is pretty significant," says corresponding author Denise McAloose, Head Pathologist at the Wildlife Conservation Society in The Bronx, New York. "And these losses represent only the deaths we know about. I imagine that there were others that we just never saw," says McAloose.

Since 2001, several rare Amur Tigers have exhibited a set of strange behaviors. Normally a reclusive species, tigers have been seen entering villages and wandering onto roads in the Russian Far East, stumbling, emaciated, and unafraid of humans. (One example can be found below). In each of the documented cases, the tiger eventually died or was destroyed after its condition worsened. Early findings showed that at least one of the tigers was infected with a member of the morbillivirus

family of viruses, but conclusive answers had evaded scientists and [wildlife managers](#) until now.

Using [tissue samples](#) from five wild Amur tigers that died or were destroyed due to neurological disease in 2001, 2004, or 2010, McAloose and her colleagues proved that infection with CDV, a type of morbillivirus, is to blame for the deaths of two of the tigers and caused a serious infection in a third. Under the microscope, the brains of the two tigers that died of CDV infection were riddled with lesions, indicating they suffered from severe viral encephalitis, consistent with their clumsy, abnormal behavior. Molecular analyses to identify CDV-specific proteins and immunolabelling with CDV-specific antibodies confirmed that CDV was present in these tissues. A gene for a CDV-specific gene was detected in the third tiger.

The problem isn't limited to one location, says McAloose. The three tigers that tested positive for CDV were distributed across the Russian Far East.

"That tells us this is a disease that is distributed all across Amur tiger range," McAloose says. "And it also appears to be a relatively new threat to tigers since blood samples from wild tigers prior to 2000 tested negative for antibodies to the virus".

But how do tigers contract a CDV infection? Relatively few domestic dogs in the Russian Far East are vaccinated against CDV, McAloose says, and tigers do kill and eat dogs, so they represent one possible source. But domestic dogs aren't the only suspects.

"In the Russian Far East, [domestic dogs](#) are one of the biggest concerns, but other species, like raccoon dogs or foxes, can also harbor the disease," says McAloose.

McAloose and her colleagues are now working on collecting samples from dogs and small wild carnivores in the Russian Far East to get a more complete picture of the various strains of CDV in circulation in the hopes of linking tiger infections to a source, knowledge that would hopefully aid in preventing more infections among tigers.

"The situation is quite serious", says McAloose, and when asked if CDV could spell the demise of Amur [tigers](#), she says, "It's possible."

"It's the first infectious disease that we know is a significant risk to Amur tiger survival," says McAloose.

Provided by American Society for Microbiology

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