

Seafood diet killing Arctic foxes on Russian island

Mercury pollution in marine animals may be behind a population crash.

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An isolated population of Arctic foxes that dines only on marine animals seems to be slowly succumbing to mercury poisoning.

The foxes on Mednyi Island — one of Russia's Commander Islands in the Bering Sea — are a subspecies of Arctic fox (*Vulpes lagopus*) that may have remained isolated for thousands of years. They were once numerous enough to support a small yet thriving group of fur hunters. After humans abandoned the settlement in the 1970s, the fox population began to crash, falling from more than 1,000 animals to fewer than 100 individuals today.

Researchers at Moscow State University wanted to find out if the population crash was caused by diseases introduced by the hunters and their dogs, so they teamed up with Alex Greenwood, head of the wildlife diseases department at the Leibniz Institute for Zoo and Wildlife Research in Berlin, as well as other colleagues in Germany and Iceland. They screened for four common canine pathogens in foxes captured on Mednyi Island and in the pelts of museum specimens of Commander Island foxes. All they found was a handful of cases of the parasite *Toxoplasma gondii*, which causes the disease toxoplasmosis, but that alone did not account for the population crash.

Dangerous diet

So the researchers looked at the foxes' diet. Mednyi Island foxes subsist by hunting sea birds and scavenging seal carcasses. Because pollutants such as mercury are known to accumulate in marine animals, particularly in the Arctic, they tested the foxes for the heavy metal and found high levels of it. The foxes' hair had 10 milligrams of mercury per kilogram on average, with peaks of 30 mg kg⁻¹. By comparison, inland foxes in Iceland had lower levels, of about 3.5 mg kg⁻¹.

Greenwood's team also compared mercury levels in the Mednyi foxes to those in the population on the neighbouring Bering Island, and in coastal fox populations in Iceland. Levels of mercury were high there, too. But the Bering Island population and the coastal Icelandic foxes had not experienced the same population crash as their relatives on Mednyi. The results were published on 7 May in the journal *PLoS ONE*¹.

The difference, the researchers think, is that the Mednyi foxes have no other options for food. Bering Island is bigger than Mednyi, with small mammals such as lemmings and voles, as well as a human population that creates rubbish that the foxes can eat. The Icelandic coastal foxes, likewise, have the option of moving inland to vary their diet.

"It's not so much what they are eating, as where they are eating," says Greenwood. "The Mednyi foxes may be more susceptible to increasing global mercury levels."

But Dominique Berteaux, an Arctic ecologist at the University of Quebec in Rimouski, Canada, cautions that the team has not definitively proved a link between mercury contamination and the population decline in this study. "It's always been a hypothesis, but it's very difficult to prove," he says.

Study co-author Ester Rut Unnsteinsdóttir of the University of Iceland in Reykjavik, who is director of the Arctic Fox Center in Súðavík, Iceland, hopes that the results will make people more aware of the pollution in Arctic waters. "We eat marine food too," she says. "Maybe they will stop and think, 'what can we do to keep the oceans clean?'"

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References



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On Mednyi Island in the Bering Sea some arctic foxes, such as the one shown here on the left, are in poor health condition, possibly because of mercury poisoning.

