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Saigas lie dead in Torgai Betpak Dala in Kazakhstan during the mass mortality event in May 2015. (photo: Joint saiga health monitoring team in Kazakhstan)

Strange Weather Triggered Bacteria That Killed 200,000 Endangered Antelope

By Merritt Kennedy, NPR, 18 January 18

Scientists knew that bacteria called *Pasteurella multocida* type B caused the mass death. Now, new research suggests that the bacteria was already present in the animals; it was triggered and became harmful because of a period of unusual weather.

Richard Kock, a professor of Wildlife Health and Emerging Diseases at The Royal Veterinary College, witnessed the "rapidly accelerating death."

"You went from one or two animals to within three or four days — thousands. And then they were all dead by the seventh day," Kock tells NPR. "The animals were showing normal behavior, normal signs, normal grazing and then suddenly they'd start looking a little bit unhappy and stop feeding. Within about three hours they were dead."

This happened across a landscape of several hundreds of kilometers. Kock says the animals showed clear signs of a form of blood poisoning called hemorrhagic septicemia, caused by the bacteria initially found in the tonsils. The bacteria "very rapidly goes within the bloodstream," causing hemorrhaging, he says.

"It's so toxic and so devastating that the animal doesn't show a lot of pathology actually, other than the hemorrhage and rapid death."

But the bacteria alone were not enough to explain the mass fatalities, which only 30,000 of the area's critically endangered saigas survived.

In a paper published today in Science Advances, the scientists say that they believe "virtually 100 percent of adults" already had the organism present in their bodies. An environmental factor must have triggered the bacteria to proliferate and kill these animals at the same time.

The culprit, Kock says, is a period of unusual heat and humidity in the ten days leading up to the mass death.

The team developed models that looked at other extinction events – one in 1981 and another in 1988 – where the animals are also believed to have died because of hemorrhagic septicemia. It compared environmental factors such as temperature, rainfall, wind and the state of the vegetation.

"You have unusually high levels of humidity each day over that 10 day period. And by doing that we could really tease it out and get a significant correlation," says Kock. That makes sense, he says, "because the bacteria in the tonsils, they're quite close to the environment of the air and they then basically, presumably, respond to that change in atmosphere. And that triggers them to start growing."

The 30,000 surviving animals probably lived because they were out of the deadly "climate envelope," says Kock. Some "bachelor" male saiga antelope move further north where the humidity was lower, he adds, and some females stayed in smaller groups in remote areas.

And while they are now recovering and breed quickly, it's not clear whether they could survive another event like this. "If we get a similar event, and all the animals are within a sort of weather envelope, it could be total extinction. It could happen in a week," says Kock.

The saigas have historically been resilient. They've lived on these lowlands since ancient times, roaming alongside mammoths, Kock adds. They're fast and adaptable. They're "survivors," he said.

There's evidence that unusual weather patterns could be having similar impacts in other animal populations, such as reindeer and musk ox. "We may be looking at a much more global effect," he adds.

Saigas "are a legacy of ancient times, and it would be very sad to see them go," he said.