

# Lemur's lament: When one vulnerable species stalks another

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Diademed sifaka. Credit: Onja Ramilijaona

What can be done when one threatened animal kills another? Scientists studying critically endangered lemurs in Madagascar confronted this difficult reality when they witnessed attacks on lemurs by another vulnerable species, a carnivore called a fosa.

This dynamic can be particularly complex when the predation occurs in

an isolated or poor-quality habitat, according to research from Washington University in St. Louis and the University of Antananarivo in Madagascar.

In the new paper published in [Ecology and Evolution](#), researchers describe how they were observing small groups of critically endangered diademed sifaka lemurs (*Propithecus diadema*) at Betampona Strict Nature Reserve when the predator struck.

"We were conducting our daily behavioral observations when we came across a very unusual sight—a predation attempt by a fosa, which is the biggest predator in Madagascar," said WashU's Giovanna Bonadonna, a postdoctoral research associate in biological anthropology in Arts & Sciences and the study's co-first author.

"What we saw was very rare," Bonadonna said. "There are other small carnivores in Madagascar, but they are not big enough to be able to prey upon an adult diademed sifaka because they are among the biggest lemurs. There are not so many predators that could actually get them."

With slender bodies and long tails, fosas (or fossas, *Cryptoprocta ferax*) have many cat-like features. They are great climbers and are sometimes compared to small cougars, though they are actually part of the weasel family.

The fosa is categorized as [vulnerable](#) by the International Union for Conservation of Nature and Natural Resources, and is at risk of extinction, as are almost all of its [lemur](#) prey. Fosas also eat other small animals such as birds and rodents.

But they're rarely caught in the act. Fosas are stealthy hunters. Researchers have mostly determined what fosas eat by examining bones and other evidence left behind in scat.

"We noticed that a female diademed sifaka that we were following after the first attack didn't run away very far," said Onja Ramilijaona, a Ph.D. candidate at the University of Antananarivo and the other co-first author of the paper. "Instead she stayed still and remained vigilant, looking at the fosa."

Ramilijaona also documented the later discovery of the remains of another diademed sifaka, presumed to have been killed by a fosa because of the condition of the remains and because of the way that branches had been broken in the area. Signs indicated a struggle in the trees.



Diademed sifaka, a critically endangered lemur in Madagascar. Credit: Onja Ramilijaona

The researchers also described other instances over a period of 19 months of observation when fosas appeared to stalk lemurs but were unsuccessful in bringing one down as food.

The impact of predation—combined with low reproductive rates and potentially high inbreeding of the lemur population of Betampona—could affect the survival of this species at this site, researchers said.

Created in 1927, Betampona was Madagascar's first protected reserve and comprises about 22 square kilometers (about 5,400 acres) of rainforest on the east coast, surrounded by [agricultural land](#). While the land itself is protected, this forest's relatively small size and isolation mean that it can be difficult for plants and animals to continue to breed and survive at Betampona.

"Although Betampona is one of the best-protected reserves in Madagascar, its isolation from other viable forests with lemur populations has created a predicament in which the critically endangered lemurs cannot engage in typical dispersal patterns, leading to genetic and demographic isolation," said Lisa Kelley, executive director of the Saint Louis Zoo Wildcare Institute. "The need to study these populations for a possible genetic management study became clear several years back, once there were indications that there were few infant births and even fewer infant survivals."

The Saint Louis Zoo and the Missouri Botanical Garden have conducted work at Betampona since the 1980s with the Madagascar Flora and Fauna Group, an international nonprofit, non-governmental organization that enables institutions to collaborate for the united purpose of conserving Madagascar's biodiversity. Washington University, the Saint Louis Zoo and the Missouri Botanical Garden are also partners in the Living Earth Collaborative.

"These most recent observations of fosa attacks are especially troubling, as the observation of predation attacks, especially by the elusive fosa, are very rare," Kelley said.

"It leads to questions of why the fosa are so bold to predate on lemurs in front of humans, and whether the fosa leave Betampona to hunt elsewhere and then return, or whether they are targeting the lemurs within the reserve," she said. "It is an incredible scenario in which you have a [vulnerable species](#) potentially over-predating on several critically endangered species."

Senior authors of the study include Krista Milich and Emily Wroblewski, both assistant professors in the Department of Anthropology in Arts & Sciences at Washington University.

"This population of diademed sifakas is already in bad shape," Bonadonna said. "There is a huge predation pressure that was underestimated until we did this behavioral study. We were able to highlight inbreeding and other factors that may be behind the fact that this population cannot thrive at Betampona.

"It's not that the fosa is the bad guy," Bonadonna said. "It's also in need of conservation. This study really highlights how complicated it can be. Human activities lead to changes in dynamics within ecosystems, having cascading effects beyond even what people realize. Despite the effort to conserve one species, it's really the ecosystem and the balance of that ecosystem that is at stake once the habitat is compromised."

**More information:** G. Bonadonna et al, Response of diademed sifaka (*Propithecus diadema*) to fosa (*Cryptoprocta ferox*) predation in the Betampona Strict Nature Reserve, Madagascar, *Ecology and Evolution*

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