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How do dogs make trouble for wildlife in the Andes?

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Abstract

What do pets and wild animals have in common? Some pets - like dogs, for instance - can easily turn back into wild animals when abandoned or let loose. This is especially true for places where people lack resources or education to properly take care of their pets. Right now, we have over 1 billion *feral* (wild) dogs roaming our planet, often in packs. These dogs are probably impacting native wildlife. We wanted to know whether dogs were a problem for eight naturally occurring carnivores in the Andean mountains in Ecuador. We set up over 500 *camera traps* with motion sensors to document whether there are fewer carnivores in areas where dogs are present. We found that roaming dogs did indeed have a negative impact on four of the native carnivores we studied.

Introduction

Humans surely love their dogs! Currently, there are over 1 billion dogs on our planet (that is about one for every 7.6 humans). Unfortunately, not all dogs are well cared for pets. In fact, only about a quarter of all dogs have owners who take good care of them. In many countries, most are wild, *stray* dogs (abandoned pets) or even wilder *feral* dogs (dogs that have never lived with humans). Because dogs are carnivores (they eat meat, and thus traditionally hunt and kill other animals), these free-ranging dogs can be a big problem for wildlife.

Dogs can harm wildlife directly by killing or hurting animals, or indirectly by competing with animals for food (eating their prey), or by spreading diseases such as rabies. They sometimes hunt in packs, which allows them to take on larger animals. Also, dogs often scrounge for food in villages or dumpsters, which gives them an advantage over carnivores who only hunt.

Figure 1:
The Andes, one of the largest mountain ranges in the world, are home to thousands of wild animals, people, and wild dogs

All of this can be particularly troubling for areas that have many dogs and are also biodiversity hotspots – places with many different kinds of native animals, like the tropical part of the Andes Mountains in South America.

The Andes run along almost the entire West coast of the South American continent (Fig. 1), crossing seven countries on their way. These mountains are patchwork of different habitats and landscapes: grasslands, forests, glaciers, volcanoes, and agricultural land with nearby towns and villages. Humans living in the region have introduced invasive species. One such species that roams the Andes by the thousands is the dog (Fig. 2).

We wanted to know to what extent dogs impact eight native mammal carnivores in the Ecuadorian part of the Andes: the pampas cat, puma, Andean fox, Andean bear, Colombian weasel, long-tailed weasel, striped hog-nosed skunk, and mountain coati (Fig. 3).

Figure 2:
A wild dog in the Andes mountains in Ecuador.

Figure 3:
Five of the eight types of native mammal carnivores as photographed by our camera traps. From left to right: striped hog-nosed skunk, Andean fox, puma, Andean bear, and mountain coati.

Methods

To find out, we selected five study areas in the northern Andes of Ecuador in which these eight native carnivore species occur, but which also have a lot of humans living in them. The study sites were from 2800-3800 metres above sea level, and were each 20x20 km^2 in size.

For 15 months, we monitored the presence or absence of our eight native carnivores and dogs. We used cameras that were positioned randomly but at least 1 km apart from each other in each of our study areas (112 cameras per site). These cameras had motion sensors so they took pictures of every animal that passed by, and they had an automatic flash so they could take pictures at night too. We applied carnivore urine near the cameras to attract carnivores (a proven trick).

To understand if factors other than dogs influence the *abundance* (numbers) of mammal carnivores in our study areas, we measured variables like distance to houses, distance to roads, vegetation type, amount of natural habitat versus habitat changed by humans, among others.

We then used two mathematical models to figure out which of our factors most reliably predicted (and thus might be linked to) whether we would find our native carnivores.

Results

This is what we found:

- Dogs were common in all of our study areas. They roamed near houses and roads but we also found them far away from both.
- The native carnivores we most often captured with our "camera traps" in all our study areas were the Andean fox and the striped hog-nosed skunk.
- We only occasionally got pictures of both types of weasels, the mountain coati and the pampas cat, so we left these four animals out of our analysis.
- Our mathematical models showed that in locations where there were no or very few dogs, we were most likely to find pumas, Andean bears, skunks and foxes. Figure 4 shows two examples of this: pumas (Fig. 4A) and Andean bears (Fig. 4B) decrease as the number of dogs rises.

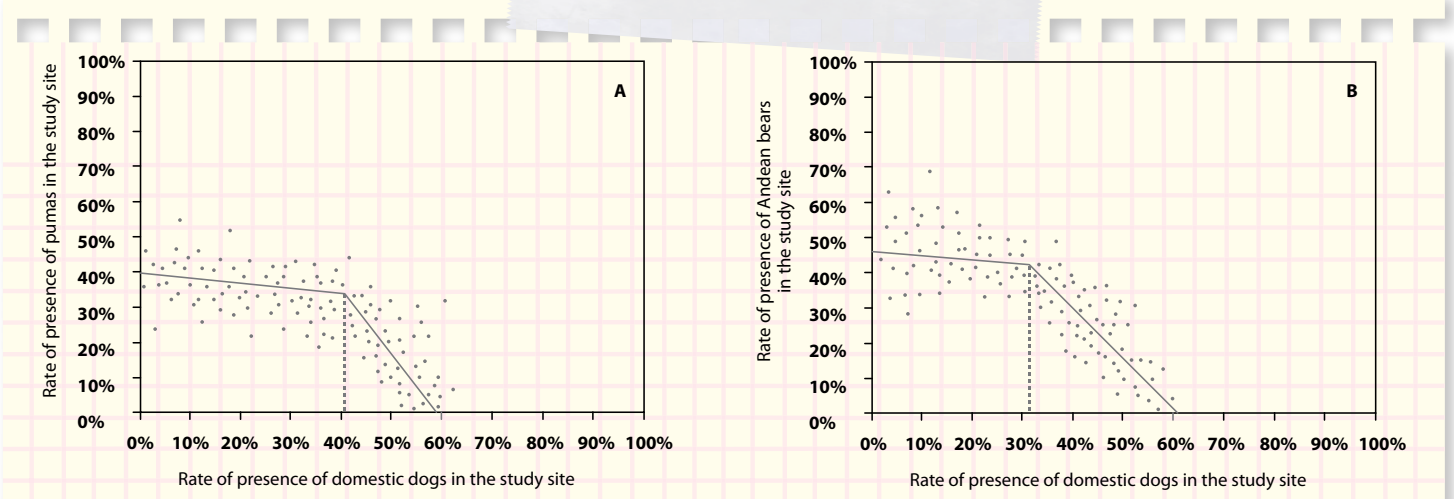

Figure 4:
Rate of presence of pumas and Andean bears in our study sites related to the presence of dogs. The dotted line shows the "breaking point", which is the crucial rate of presence of dogs when Andean bears and pumas start to decline sharply.

What happens to Andean bears and pumas in our study sites when dogs are more frequent? How high is the rate of presence of dogs when pumas/Andean bears start to decline sharpy (their "breaking point")?

Discussion

Many studies before ours have shown that habitat destruction and *fragmentation* (habitats being broken up into patches) are key factors that affect the abundance of native animals in natural areas.

However, our study shows that in the Andes of Ecuador dogs seem to be more important for predicting whether four native carnivores will be present: pumas, Andean bears, Andean striped hog-nosed skunk and Andean fox. The more dogs we saw in our cameras, the fewer of these animals we found. We think dogs are a significant threat to these four native carnivores and probably to many other animals in the Andes as well.

Ultimately, the threat dogs pose to animals in the Andes and elsewhere is real and likely underestimated. But how much damage do dogs cause to wildlife in the Andes? Unfortunately, we have little knowledge of how common most native animals were in the past in this area (this means we have no *baseline* to compare our numbers against). So we can't say with certainty to what extent dogs are reducing the native *fauna* (animals of that area), but they are certainly impacting it.

Conclusion

It's fun to have pets, but being a pet-owner comes with great responsibility: we need to take care, not only of our own pet, but also people or animals that our pets might harm. We know feral cats are a huge problem for birds, but the threat to wildlife from free-ranging dogs is still little understood. There are many things that you can do to make sure your pet doesn't turn into a hazard for other animals: always make sure to stay on top of vaccinations and health check-ups; if you own a cat or a dog, have it neutered, and make sure it wears a collar with your name and phone number on it. Also, train your dog not to chase wildlife. (Yes, it is possible!) Most importantly, never release your pet animal into the wild where it can harm local wildlife.

Glossary of Key Terms

Abundance – the number of individuals of a species in a given area.

Baseline – a minimum or starting point used for comparisons.

Biodiversity hotspot – a region with an especially high local diversity (lots of different types of species) that is under threat.

Camera traps – remotely activated cameras that are equipped with a motion sensor or an infrared sensor. They are a method for capturing wild animals on film when researchers are not present.

Carnivore – an animal that mainly eats or only eats meat.

Domesticated – animals that are tamed and kept as pets or on farms.

Fauna – the animals of a particular region, habitat, or period in the earth's history.

Feral – animals that were domesticated at one time but are now living wild.

Fragmentation – the process or state of breaking or being broken into small or separate parts. For natural habitats, fragmentation occurs when habitat gets destroyed or converted into space for humans or agriculture, leading to a patchwork of natural habitat among less wildlife-friendly spaces.

Invasive species – a type of organism that is not native to (not originally from) a particular area and can cause harm there.

Native – something that originally comes from that particular area. Andean bears are native to the Andes, while dogs are not native (instead, they are invasive) to the Andes.

Stray – a stray animal is a pet that has been abandoned.

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Check your understanding

1 Why can dogs be a problem for wildlife and domesticated animals?

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2 Why do you think our study showed that dogs had a bigger impact on wildlife in the Andes than habitat fragmentation and destruction did?

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3 Why don't we know how large of a threat dogs are in the area, even after our study?

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4 What other pets can you think of that might be a threat to native animals?

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5 What can you do to make sure your pet is not harmful to local wildlife?