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How dogs evolved with climate change

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As temperatures in North American cooled and conditions became dryer over the past 40 million years, dogs slowly evolved from creatures that would ambush their prey to the modern wolf-like ones capable of tracking their prey for an entire day, a new study has found.

By studying fossils dating back to the beginnings of those changes, **Brown University** (<https://www.brown.edu/>) ecology and evolutionary biology professor Christine Janis and Borja Figueirido, a professor at Spain's **Universidad de Málaga** (<http://www.uma.es/>), found evidence that these predatory creatures are sensitive to climate change.

The reason, they explained, is because it alters the hunting opportunities present in their habitats. In the case of canines, fossils indicate that they were originally small creatures that looked more like mongooses than modern dogs, and had forelimbs that were not yet fully adapted for running. Part of the reason for this was that dogs primarily called the forest their home.

As the climate cooled over time and the Rocky Mountains reached a growth threshold that caused the continental interior to become drier, those forests eventually faded away and gave rise to grasslands. In a study published this week in *Nature Communication* (<http://www.nature.com/ncomms/index.html>), the authors reported on their efforts to measure the impact this transition had on dogs and other carnivores.

Climate change 'critical' for evolutionary processes

Janis, Figueirido and their colleagues examined the elbows and teeth of 32 different species of canines ranging from around 40 million years ago to two million years ago. They found patterns proving that dogs were evolving from ambush predators to pursuit-pounce predators (like modern foxes) and ultimately to wolf-like predators at the same time climate change was occurring.

Figueirido told redOrbit that the shift from wooded habitats like forests to open plains, prairies, and savannahs “also entailed a change in the predatory behavior of carnivores.” The study, he continued, “confirms that their skeleton became increasingly modified towards the morphology of extant fast-running predators” in correlation with the spread of grasslands.

“It is highly interesting that not only mammalian herbivores were the groups affected by climatic change and its impact on vegetation and environments,” the professor said via email. “Our study also reveals that predators change their hunting habits in association with habitat opening related to climatic change. Therefore, long periods of profound climatic change are critical for the emergence of ecological innovations, and could alter the direction of lineage evolution.”

While Figueirido said that one study alone cannot predict what future changes could happen in response to the current climatic situation, and that doing so would be “a really difficult task.”

(Image credit: Mauricio Anton)