

# Oldest fossil rodents in South America confirms animals from Africa

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In a literal walk through time along the Ucayali River near Contamana, Peru, a team of researchers found rodent fossils at least 41 million years old – by far the oldest on the South American continent.

The remains – teeth – showed these mouse- and rat-size animals are most closely related to African rodents, confirming the hypothesis that early rodents of South America had origins in Africa, said Darin Croft, an anatomy professor at the Case Western Reserve University School of Medicine and member of the research team.

This discovery supports the contention that rodents landed in the north and spread south. The rodents are from the suborder Caviomorpha, the group that includes living rodents such as guinea pigs, chinchillas, and New World porcupines. The oldest fossils from this group are only about 32 million years old in central Chile and about 30 million years old in Patagonia, Argentina,. Taken all together, the pattern contradicts the theory of a northward expansion deduced from the fossil record 20 years ago.

The findings, which describe three new species, are published online in *Proceedings of the Royal Society B*.

"This really pushes back the date of the first South American rodents," said Croft, a paleontologist who specializes in mammalian evolution.

Pierre-Olivier Antoine, a professor of paleontology in the Institute of

Evolutionary Sciences at Montpellier University in southern France, asked Croft to join the team of scientists from France, Germany, [Peru](#) and Panama. Members first flew into the region in 2008, after reading Harvard Geology Professor Bernhard Kummel's 1948 description of the area.

Kummel mentions fossils along the Ucayali, a major tributary of the Amazon, but the team found no evidence that anyone had investigated them.

During three trips from 2008 to 2010, Antoine's group found the fossils in a portion of the riverbank exposed when the water level is low.

The geology along the river showed that layers of rock, including the fossil layer, had been pushed up in a rainbow-shaped fold, called an anticline. The layers that had once been above or below the fossils turned from horizontal to nearly vertical. Instead of digging down to the past, the scientists walked downstream from the fossil layer to go back in time, upstream to go forward in time.

Ash found among silt particles 47 meters forward in time was dated at 41 million years ago using argon-argon radioactive dating, providing the minimum age of the fossils.

The date is supported by genetic studies of living African and South American rodents that show the animals are of common origin and estimate the animals arrived in South America during the Mid-Eocene Climatic Optimum, or about 40 million years ago.

At that time, other scientists estimate, an African [rodent](#) on a raft of vegetation could have reached Northeast Brazil in one to two weeks.

The characteristics of the teeth found reinforce the connection between

the continents: the morphologies are closest to those of African rodents.

The dental features indicate the rodents probably ate soft seeds and plant parts as many small rodents do today.

Pollen extracted from the fossilized mud that contained the teeth suggests these rodents lived in a rain forest, much like the rain forest there today.

The new species, however, are smaller than nearly all caviomorph rodents today. This group includes the largest living rodent, the capybara, which can reach 150 pounds.

*Cachiyacuy contamanensis*, named for the Contamana region, appeared to be the size of a small rat.

*Canaanimys maquiensis*, named for the specific locality the fossils were found, and *Cachiyacuy kummeli*, named for Kummel, were about the size of a field mouse.

Remains of two more rodents found at the site appear to be the same as those described, but not dated, in a 2004 study from Santa Rosa, Peru, in the Amazon basin southeast of this site. The authors of the new paper identified them by their genus only: *Eobranisamys* and *Eospina*.

Remains of other mammals such as marsupials, an armadillo, and several types of hoofed mammals were also found at the site, but most are too fragmentary to identify precisely. They appear to be closely related to species from 45 to 35 million-year-old [fossil](#) sites elsewhere in South America, further supporting the age of the Peruvian site.

"This study shows that where we're looking for fossils has a major effect on what we think we know about mammal evolution," Croft said. While

Patagonia in the extreme south of the continent has been well researched, comparatively few [fossil](#) beds have been found in much of the rest of [South America](#), especially in more tropical areas.

"There are still a lot of great fossils to be discovered," Croft said. He doubts, however, that much older caviomorph fossils will be found. "Odds are pretty low that we would push back the date for these rodents by more than a million years or two."

The fossils are permanently stored at the Museum of Natural History in Lima.

Provided by Case Western Reserve University

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