

Discovery sheds new light on the habitat of early apes

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The early ape *Proconsul* (center) and the primate *Dendropithecus* (upper right) inhabited a warm and relatively wet, closed canopy tropical seasonal forest 18 million years ago in equatorial eastern Africa (Rusinga Island, Kenya). Credit: Jason Brougham

Baylor University researchers, in collaboration with an international team of scientists, have discovered definitive evidence of the environment inhabited by the early ape *Proconsul* on Rusinga Island, Kenya. The groundbreaking discovery provides additional information that will help scientists understand and interpret the connection between habitat preferences and the early diversification of the ape-human lineage.

Their research findings—published this month in *Nature Communications*—demonstrate that *Proconsul* and its primate relative *Dendropithecus* inhabited "a widespread, dense, multistoried, closed canopy" [forest](#). [The study is available here online](#).

[Daniel Peppe, Ph.D.](#), assistant professor of geology in Baylor's College of Arts and Sciences, said that previous work on the fossil sites on Rusinga Island suggested a variety of contradictory environmental preferences for *Proconsul* and that none of the previous work could definitively tie *Proconsul* to a specific habitat.

"Our research findings provide direct evidence and confirm where the early ape lived about 18 to 20 million years ago," Peppe said. "We now know that *Proconsul* lived in a closed-canopy, tropical seasonal forest set in a warm and relatively wet local climate."

Lauren Michel, lead author of the study and a doctoral student in the geology department at Baylor, was among the team of international researchers who found fossils of a single individual of *Proconsul* among geological deposits that also contained tree stump casts, calcified roots and fossil leaves. This discovery "underscores the importance of forested environments in the evolution of early apes," Peppe said.

"While excavating one of the major fossil sites on Rusinga Island, our team found four teeth from *Proconsul* amid an expansive fossil forest system," Michel said. "Ultimately, we were able to find 29 tree stump casts and unearth root casts in the same horizon as the fossil teeth."

"The varying diameters of the tree stumps coupled with their density within the fossil soil, implies that the forest would have been comprised of trees with interlocking or overlapping branches, thus creating a canopy," Michel said.

Also, further evidence from the excavation site has shown that the landscape was "stable for decades to a few hundred years while the forest grew," Michel added.

Adding to the novelty of the research teams' findings is how all of forest artifacts were contained in one layer or strata.

"What is spectacular about this discovery is that all of these individual elements—tree stumps, leaves, roots, animals—are tied together in a single stratigraphic interval. This gives us tremendous resolution in reconstructing the specific environment inhabited by one of our early ape ancestors," said Kieran P. McNulty, Ph.D., co-director of research on Rusinga Island and associate professor of anthropology at the University of Minnesota.

Researchers were also able to determine the climate for the fossil forest.

"Evidence from the forest fossil soil suggests that the precipitation was seasonal with a distinct wet and dry period. During the dry season, there was probably relatively little rainfall," Peppe said. "Additionally, by studying fossil leaves at the site, we were able to estimate that there was about 55 to 100 inches of rainfall a year and the average annual temperature was between 73 and 94 degrees Fahrenheit."

Research on Rusinga Island has been ongoing for more than 80 years and has resulted in the collection of thousands of mammal fossils, including many well-preserved specimens of *Proconsul* and other primates.

Evidence from these fossils of *Proconsul* indicate that it probably had a body position somewhat "similar to modern monkeys," but that details of its anatomy suggest some "more ape-like climbing and clambering" abilities. Since 2011, the team's research at the [fossil](#) forest site has resulted in the collection of several additional new primate fossils.

"This understanding of *Proconsul*'s skeletal anatomy and how it moved demonstrates that the species was well-suited for life in a dense, closed canopy forest, which is consistent with our findings," Michel said.

Provided by Baylor University

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