



## When the Forest Left the Apes

Ecological continuity between orangutans and extinct ancestors highlights their dependence on intact rainforests

**Frankfurt, 08/09/2022. An international research team around Prof. Hervé Bocherens of the Senckenberg Centre for Human Evolution and Palaeoenvironment at the University of Tübingen and his PhD student Sophie G. Habinger has reconstructed the habitat of the ancestors of orangutans in present-day Myanmar as part of the collaborative project EVEPRIMASIA between the Universities of Tübingen, Germany, and Poitiers, France. The results of the study, recently published in the journal “Scientific Reports,” highlight the orangutans’ dependence on intact forests and the need to protect their remaining refuges and habitats.**

Unlike other great apes such as gorillas or chimpanzees, orangutans (*Pongo*) have several known fossil ancestors. Today, orangutans are restricted to the islands of Borneo and Sumatra in Southeast Asia, where they are critically endangered. “Their ancestors’ range in the late Miocene, on the other hand, extended over a vast area from Turkey, through easternmost Pakistan, India, Nepal, and Myanmar to Thailand,” reports paleobiologist Sophie Habinger. The study focuses on the orangutan’s ancestor *Khoratpithecus ayeyarwadyensis*, whose fossils were found in the Irrawaddy Formation in modern-day Myanmar, as well as other fossil representatives of the subfamily Ponginae, such as *Indopithecus*, *Sivapithecus*, and *Gigantopithecus*. The reconstruction of their habitat and its use allows important conclusions about the requirements and protection of today’s orangutans. “In order to develop efficient strategies for the protection of endangered species, we need a sound understanding of their ecological flexibility. One way to obtain this information is to study the ecology of their ancestors,” explains Hervé Bocherens, the study’s last author.

The researchers used a technique for measuring stable carbon and oxygen isotopes in fossil tooth enamel to reconstruct the habitat of the orangutan ancestor *K. ayeyarwadyensis* and the associated mammal fauna. In the late Miocene, the terrain of the Irrawaddy Formation – a rather barren region today – featured a mosaic of dense and open forest patches interspersed with rivers. *K. ayeyarwadyensis* likely foraged for fruits and leaves in the upper

PRESS RELEASE  
08/09/2022

### Contact

Sophie G. Habinger  
Department of Geosciences  
Tübingen University  
Phone 07071 29 73231  
sophie-gabriele.habinger@uni-tuebingen.de

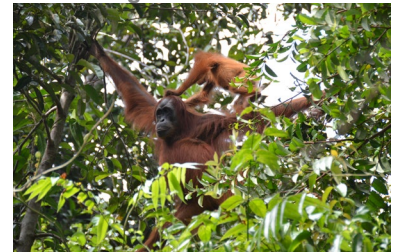
Prof. Hervé Bocherens  
Senckenberg Centre for Human  
Evolution and Palaeoenvironment  
Tübingen  
Phone 07071 29 76988  
herve.bocherens@senckenberg.de

Katharina Decker  
Press Office  
Senckenberg Gesellschaft für  
Naturforschung  
Phone 069 7542 1595  
pressestelle@senckenberg.de

### Publication

Habinger, S.G., Chavasseau, O.,  
Jaeger, J.J. et al. Evolutionary  
ecology of Miocene hominoid  
primates in Southeast Asia. *Sci  
Rep* 12, 11841 (2022).  
<https://doi.org/10.1038/s41598-022-15574-z>

### Press Images



The ancestral habitat study highlights the dependence of today’s orangutans on intact rainforests.

Photo: SUAQ Orangutan Project



To reconstruct the habitat of *Khoratpithecus ayeyarwadyensis*,

### SENCKENBERG GESELLSCHAFT FÜR NATURFORSCHUNG

Katharina Decker | Referentin für Presse- und Öffentlichkeitsarbeit | Stab Kommunikation

T +49 (0) 69 75 42 - 1595 F +49 (0) 69 75 42 - 1517 [katharina.decker@senckenberg.de](mailto:katharina.decker@senckenberg.de) [www.senckenberg.de](http://www.senckenberg.de) M +49 (0) 152 02849517

SENCKENBERG Gesellschaft für Naturforschung | Senckenberganlage 25 | 60325 Frankfurt am Main  
Direktorium: Prof. Dr. Klement Tockner, Prof. Dr. Angelika Brandt, Dr. Martin Mittelbach, Prof. Dr. Andreas Mulch, Prof. Dr. Karsten Wesche



Mitglied der Leibniz-Gemeinschaft



reaches of the canopy. “The habitat of *K. ayeyarwadyensis* was therefore very similar to that of present-day orangutans. Overall, the comparison with other ancestral forms such as *Sivapithecus* also shows that the species occupied similar ecological niches – all were tree dwellers that fed primarily on fruit. At the same time, we were also able to reconstruct obvious differences in habitat use – for instance regarding food composition – and thus an adaptation to a very specific niche,” says Bocherens.

During the Pleistocene, the habitat of the Ponginae shifted southward, probably due to an increasingly cooler and drier climate that led to changes in the vegetation and a thinning of forests, causing the orangutan’s ancestors to disappear. “The results of our study suggest an ecological continuity between all fossil and present-day Ponginae. Here, the shift in their range within the last ten million years suggests a low tolerance of this group for less forested and drier ecosystems,” explains Olivier Chavasseau of the Université de Poitiers. Habinger elaborates on the implications of these findings for present-day orangutans. “Orangutans in Sumatra and Borneo are under constant pressure due to human activity and habitat loss. If the forest there continues to be further fragmented by clearcutting, the orangutans will face the same fate as their ancestors – they will become extinct. This must be counteracted by efficient conservation measures to protect their habitat.”

*The **University of Tübingen** is one of eleven universities in Germany that were recognized as excellent. Within the life sciences, it provides top-of-the-line research in the fields of neurosciences, translational immunology and cancer research, microbiology and infectious disease research, as well as molecular biology. Additional research emphasis is given to machine learning, geo- and environmental research, archeology and anthropology, language and cognition, and education and media. More than 27,600 students from all over the world are currently enrolled at the University of Tübingen, where they can choose from over 200 study courses – from Archeology to Zoology.*

*The **Senckenberg Gesellschaft für Naturforschung (Senckenberg Nature Society)**, a member institution of the Leibniz Association, has studied the “Earth System” on a global scale for over 200 years – in the past, in the present, and with predictions for the future. We conduct integrative “geobiodiversity research” with the goal of understanding nature with its infinite diversity, so we can preserve it for future generations and use it in a sustainable fashion. In addition, Senckenberg presents its research results in a variety of ways, first and foremost in its three natural history museums in Frankfurt, Görlitz, and Dresden. The Senckenberg natural history museums are places of learning and wonder and serve as open platforms for a democratic dialog – inclusive, participative, and international. For additional information, visit [www.senckenberg.de](http://www.senckenberg.de).*

the researchers sampled a mandibular molar for stable isotope analysis. Photo: Olivier Chavasseau

Press images may be used at no cost for editorial reporting, provided that the original author’s name is published, as well. The images may only be passed on to third parties in the context of current reporting.

This press release and the images are also available at [www.senckenberg.de/presse](http://www.senckenberg.de/presse)