

## Evolution & Behaviour

# Homo floresiensis – little species, big mystery

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A new kind of human, *Homo floresiensis* was a surprise discovery in 2003 by an Australian-Indonesian archaeological team who were trying to find the origins of the first Australians. Their focus was [Liang Bua cave](#), on the island of Flores, Indonesia. Instead of finding modern human bones, they discovered something completely unprecedented. Deep in the excavation were bones representing a number of very different and very small individuals dated to between 100,000 and 60,000 years ago. These bones represent a new species and are named *Homo floresiensis*.

14 years on, and we know a lot about *H. floresiensis*. Individuals were short - about 1 meter tall. They had a small brain of only 426 cm<sup>3</sup> (ours average 1300-1500cm<sup>3</sup>); had backward sloping foreheads, yet they possessed an expanded [frontal cortex](#). This implies they could do some smart things such as plan, learn from mistakes, and hand down information from generation to generation. They lacked a chin, and instead had some ape-like structures inside the jaw. Wrist bones were also ape-like. The arms were relatively long and its shoulders were shrugged and hunched forward. This species walked upright. Its walk, however, would have been somewhat odd because its feet were quite long compared to its legs. It had to lift those feet up higher than we do, just to get ground clearance.

The mystery is - where does this species fit on the human evolutionary tree? Two hypotheses were originally proposed:

1) That *H. floresiensis* was the dwarfed descendant of a *Homo erectus* population that evolved under conditions of isolation on a small island (the "island rule").

The "island rule" stipulates that body size of mammals alters when a founder population reaches an island, becomes reproductively separated from its mainland origin group and faces an environment different from that of its mainland cousins. For example, a smaller body size could be expected as an evolutionary response to a limited food supply, and conversely a larger body size may occur in the absence of predation. *H. erectus* is the only known early hominin species from Indonesia. It is much larger than *H. floresiensis* and lived on Java 1.5 million years ago. There is no evidence for *H. erectus* on Flores, but then, Flores is relatively unknown archaeologically.

2) That *H. floresiensis* derived from an early lineage of *Homo*, similar to species that are known from around 2 million years ago in Africa, which were all relatively short. This would imply that an unknown founder population of archaic hominins arrived on Flores. Until recently we had no indication that a small hominin species had got to Flores, but in 2016 archaeologists at Mate Menge, about 74 kms from Liang Bua cave, discovered a *H. floresiensis*-like, but smaller, partial jaw of an adult individual, and some teeth, that are dated to 700,000 years ago.

We tested the two hypotheses by comparing characteristics of the cranium, jaws, dentition, shoulders, arms and legs of *H. floresiensis* with *Australopithecus afarensis*, *A. africanus*, *A. sediba*, *H. habilis*, *H. ergaster*, *H. georgicus*, *H. naledi*, *H. erectus*, *H. floresiensis* and *H. sapiens*. This is the first time that the *H. floresiensis* question had been addressed using a "whole-of-body" approach. Most previous work had focused on crania, mandibles and teeth.

Our results showed that *H. floresiensis* and *H.*

*habilis* were closely related. *H. habilis* a species known only from Africa, dated to around 1.4-1.8 million years ago. *H. floresiensis* and *H. habilis* form "sister species" in our phylogenetic tree, which means that they most likely shared an immediate common ancestor. *H. erectus*, on the other hand, formed a sister species to the 1.5 million year old *H. ergaster* from East Africa. That is, *H. floresiensis* and *H. erectus* are not closely related at all and in additional tests we performed we found no statistical support for a close phylogenetic relationship between these two species.

*H. floresiensis* was a relict population that had descended from an unknown lineage of small, ~2 million year old hominins that lived half a world away. This represents an earlier diffusion of hominins out of Africa than we expected, and we now have the tantalizing prospect of one day finding *H. floresiensis* in Africa.