New human species discovered in the Philippines

Frank Gaglioti
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The discovery of a new human species, *Homo luzonensis* on the island of Luzon in the Philippines has further highlighted the complexity of human evolution. The findings were published in April in the journal *Nature* in an article entitled "A new species of Homo from the Late Pleistocene of the Philippines."

The lead scientist was the archaeologist Armand Mijares from the University of the Philippines, along with scientists from Australia and France.

Mijares found evidence of ancient human activity in the Callao cave located in the north of Luzon in 2003. He was spurred on to dig down to deeper strata after the discovery of *Homo floresiensis*, commonly referred to the Hobbit due to its diminutive size, on the island of Flores in Indonesia in 2004.

The breakthrough came in 2007 when Mijares found a foot bone. Subsequent excavations in 2011 and 2015 unearthed two more toe bones, a thigh bone, seven teeth, and two finger bones. The fossils came from two adults and a child and are between 50,000 and 67,000 years old.

"From the beginning, we realised the unusual characteristics of these fossils," Florent Détroit, a palaeoanthropologist from France's Musee de l'Homme, told a press briefing. "We completed the comparisons and analyses, and it confirmed that this was something special, unlike any previously described species of hominins in the homo genus," he said. Hominins include modern humans and all species that are considered ancestral to them.

The scientists conducted a three-dimensional analysis and computer modelling of the bones and found a mixture of modern and more ancient traits. The teeth are relatively small with simple shapes suggesting modern origins, but the upper molar has three roots, an extremely rare trait in modern humans. One of the foot bones is curved, resembling Australopithecines (earlier hominins), and suggesting an arboreal existence as well as walking upright. It is thought that *H. luzonensis* had a relatively small size, although this is not conclusive due to the lack of larger bones.

Every hominin fossil discovery deepens our understanding of human evolution. It is thought that humans evolved from Australopithecines, known as the southern ape. These emerged in Africa around Ethiopia, Kenya and Tanzania about four million years ago and are known to have survived to two million years ago. Several Australopithecines have been discovered, including A. afarensis that was able to walk upright but still inhabited trees.

The most famous Australopithecine was Lucy, a representative of *Australopithecus afarensis* discovered in 1974 by Donald Johanson in Ethiopia. Although Lucy had a relatively small brain, the critical development was that she walked upright, freeing the hands for the use of tools. Features such as speech and increased brain capacity evolved later.

The species that is thought to have evolved from the Australopithecines was *Homo habilis*, first discovered in Tanzania by the famous Kenyan paleoanthropologist and archaeologist Louis Leakey in 1962 and 1964. *H. habilis* or "handy man" was a proficient tool maker and was considered to have lived between 2.8 to 1.4 million years ago. The species had a larger brain than *A. afarensis*.

The next major species to emerge was Homo erectus, or upright man, which was originally discovered in Java in 1886 and existed from 1.89 million years ago to 143,000 years ago. *H. erectus* had a body structure very similar to modern humans and was known to be able to run considerable distances. The species was associated with the significant invention of hand axes and was the first to migrate out of Africa.

Our species, *Homo sapiens*, or intelligent man, was thought to have evolved 300,000 years ago. Numerous other Homo species have been discovered, but it is not always straightforward to determine their exact relationships. The ability of scientists to extract DNA from relatively recent fossils has enabled a better estimation of the complex genetic connections.

Neanderthals are considered our closest relative and were known to have existed 400,000 to 40,000 years ago. They had a much stockier body than H. sapiens but a similar sized brain. They had a very sophisticated tool kit and had mastered the use of fire. Some scientists consider them a subspecies of modern humans and have found evidence of interbreeding.

A limited number of bone fragments discovered in Siberia in 2010 have been called Denisovans. A finger bone indicated a robust body structure similar to Neanderthals. Mitochondrial DNA analysis has shown a close similarity to Neanderthals and

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modern humans. Part of the Denisovan genome is shared with modern humans in South East Asia and Australian Aborigines.

The period that the latest discovery, *H. luzonensis*, is known to have existed is a complex one for human evolution. Recent discoveries have shown that several hominin species existed contemporaneously, including modern humans, Neanderthals, Denisovans and *H. floresiensis*.

A recent study published in *Nature* in February, "Mosaic dental morphology in a terminal Pleistocene hominin from Dushan Cave" in southern China reported the discovery of atypical *H. sapiens* fossils that were 15,000 years old with primitive characteristics similar to *H. luzonensis* and *H. floresiensis*.

Research Chair in Human Origins at Lakehead University in Canada, Matthew Tocheri, stated in an accompanying commentary in *Nature*: "One thing can be said for certain—our picture of hominin evolution in Asia during [this time] just got even messier, more complicated and a whole lot more interesting."

Hominin species at the time were known to have interbred but it is unclear how *H. luzonensis* evolved. The low number of *H. luzonensis* bones, particularly the absence of a skull, and the lack of DNA, which is not preserved in hot humid climates, makes it difficult to determine the exact relationship to other hominin species.

Evidence of butchery was discovered with the fossils in the Philippines. Scientists reported the discovery of deer bones with cut marks from stone tools in the same strata as *H. luzonensis*, indicating the hominin was a proficient tool maker.

Scientists do not understand how hominins were able to get to Luzon Island as it has never had a land bridge even at the height of the ice age when ocean levels were at their lowest. Nor is it known which hominin first arrived on the island.

The only other evidence of primitive humans on Luzon was reported in a paper published in *Nature* in May 2018 "Earliest known hominin activity in the Philippines by 709 thousand years ago." It indicated the presence of an unknown hominin species that had butchered an ice age rhinoceros. Along with the butchered animal 57 stone tools were found.

"Although the identity of these archaic toolmakers remains unknown, it is likely that they dispersed over at least one sea barrier to reach Luzon Island," the paper stated.

The announcement of the discovery of *H. luzonensis*has sparked debate.

One theory is that *H. erectus* was the ancestor of *H. luzonensis* and *floresensis*, and experienced physical shrinking due to its island habitation. Islands are known to cause strange evolutionary consequences, such as shrinking or increases in size, due to the isolation of species. It is a phenomenon known as the "island effect." On the Indonesian island of Flores, for instance, fossils have been found of extinct elephants that shrank to the size of a pig.

Paleoanthropologist Matthew Tocheri from Lakehead University in Canada has posited a different interpretation. "I don't really buy into the idea that it's island-dwarfed *Homo erectus* ," he said, speculating instead that a tiny hominin from Africa migrated to Asia and populated Flores and Luzon.

Darren Curnoe, associate professor at ARC Centre of Excellence for Australian Biodiversity and Heritage at the University of New South Wales, has argued that the scientists have not explained how a species with *Australopithecus*-like features arose such a distance from Africa and as recently as 50,000 years ago. Speaking of the discovery of *H. floresensis* in Indonesia, he questioned the accuracy of the dating technique, Uranium-series, used to determine the age of the fossils.

"[W]hile the Hobbit might have prepared us philosophically for yet more radical discoveries, the case for *Homo luzonensis* needs to be judged solely on its merits. I think I'd prefer to leave the fossil in what Kenyan archaeologist and anthropologist Louise Leakey used to call the 'suspense account' until we have a lot more evidence," Curnoe stated.

In other words, pending new evidence, it is unclear how a throwback to a more primitive hominin such as Australopithecus, that existed only in Africa and at least two million years ago, could arise in distant South East Asia and in a period when modern humans were known to already exist.

The latest find adds to our knowledge of the complex evolutionary path of hominin species and fills an important gap in our understanding, but opens up more questions to answer.

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