



Model - 18th Dynasty - Head of an Ibis in bronze 13.187

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Then there are the deeper cuts. For example: Where did Egypt get the millions — yes, millions — of African sacred ibises that they mummified as offerings to the god Thoth?

Experts have put forth a number of explanations, including large-scale ibis breeding farms. DNA analysis from a study published Wednesday in the journal PLOS One undercuts that hypothesis, and may help archaeologists get closer to solving the riddle.

The study's authors also managed to obtain full mitochondrial genomes from more than a dozen mummified ibises, further proving "the feasibility of Egyptian mummies for ancient DNA studies," said Albert Zink, head of the Institute for Mummy Studies at Eurac Research in Bolzano, Italy, who was not involved in the study.

Egyptian catacombs are filled with mummified animals, from tiny wrapped scarab beetles to baboons enshrined in sarcophagi. Priests prepared the mummies, decorated them and sold them to the public at various price points.

Experts say people bought them to show their gratitude to the gods, or to enhance their prayers. It was similar to "going to church and offering a candle," said Sally Wasef, a paleogeneticist at the Australian Research Center for Human Evolution at Griffith University and the lead author of the recent paper.

ImageAn African sacred ibis in Botswana.

An African sacred ibis in Botswana.Credit...Dickie Duckett/Minden Pictures, via AP Images

Thoth — the god of magic, writing and wisdom, among other things — was generally depicted with the head of an African sacred ibis, a wading bird with a distinctive scythe-like beak.

If you climb down into a particular section of catacombs at Saqqara, Dr. Wasef said, "the rooms are filled from floor to ceiling" with mummified ibises once proffered to Thoth in hopes that the deity would help devotees improve their writing skills or take down a nasty boss.

It was a thriving business for the priests. Over five million such mummies have been found in various necropolises, likely deposited between around 664 B.C. and 250 A.D.

"The question was where they got that large number" of ibises, said Dr. Wasef.

Some have theorized that the priests filled their quotas by feeding and catching wild ibises. African sacred ibises have been extinct in Egypt since the 19th century — so it's difficult to know whether they ever flocked there in great enough numbers to keep up with demand, although they maintain large populations elsewhere in Africa today.

Others have suggested that on large-scale ibis farms, priests bred and raised domesticated birds the way people raise chickens and other fowl today. This hypothesis was bolstered by ancient texts that appear to refer to such farms — one priest writes about feeding the birds “clover and bread.” At least one mummy had a broken and healed wing bone, suggesting someone tended to the ibis. But no one has found evidence of an ibis breeding facility in Egypt.

To answer this question, the researchers took tissue samples from a number of different ibis mummies.

Genetic material tends to degrade quickly, especially in hot and humid environments like catacombs. But the Egyptians’ preferred mummification process removed a lot of water from the body, along with internal organs that would normally leak destructive bacteria.

It’s almost “as if they knew this is how to preserve DNA,” Dr. Wasef said.

The team were able to sequence the complete mitochondrial genomes of 14 mummified birds.

If the ibis mummies had been domesticated, those genomes would probably have a lot in common with each other, like “chickens from the same farm,” Dr. Wasef said.

Instead, the mummy DNA showed a lot of variation — about the same amount found in African sacred ibises today. (The team sequenced a number of those, too, for comparison.)

The variation is equivalent to “what you’d see in a wild population, freely moving and freely interbreeding” she said, and undercuts the domestication theory. Salima Ikram, an animal mummy expert and another of the study’s authors, cautioned that “many more tests need to be done” before the idea of ancient Egyptian ibis farms can be dismissed.

“I think there’s more to the story,” Dr. Ikram said.

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