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Capturing the past using DNA from Sacred Ibis Mummies

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ABSTRACT

Millions of Egyptian Sacred Ibis were found mummified and stored in vast catacombs. Thoth priests sold the mummified Ibis to pilgrims for offerings. Did they mass farmed the Ibises? Our analysis of the bird's DNA did not identify the tell-tale genetic signs of farming. Priests tamed Ibises by feeding them.

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Animals were significant to the ancient Egyptians as they considered them Gods living on earth. By far, the most numerous mummies found are those of the Sacred Ibis, worshipped as the incarnation of the God Thoth. Thoth was the God responsible for maintaining the universe, judging the dead, and for writing and science. By offering an Ibis mummy, people were seeking physical or spiritual healing, asking for justice, or hoping that a wish might be granted.

Perhaps it is not surprising then that millions of mummified and wrapped birds were sacrificially offered to Thoth. Approximately 10,000 Ibis a year were deposited in the sacred animal necropolis at Saqqara, which amounts to an estimated 1.75 million birds stored at that location alone. Similarly, another catacomb at Tuna el-Gebel contains approximately four million Sacred Ibis mummies.

For the priests, the mummification of the Sacred Ibis was not just a ritual duty but was also a very profitable business. Given the millions of mummies found today, one has to wonder how the priests secured such a large number of birds. These birds disappeared from Egypt in ~1850, centuries after the cessation of the mummification practice. There has been a debate about how priests were able to obtain such a large number of birds. The general opinion was that they were domesticated and held in large centralised farms. We used several ancient DNA (aDNA) methods to unravel this mystery. Specifically,

we used the abundant mitochondrial DNA (mtDNA), which is found in thousands of copies in a cell. Furthermore, we used the well-preserved mitochondrial DNA as a storyteller about what happened in the past. We were curious to know how the priests ran their business successfully.

We collected bone, feather and soft tissue samples from the mummified Sacred Ibises found in four major catacombs in Egypt. We also collected blood and feathers from wild Ibis populations from Africa. The preservation of bodies through mummification is a hallmark of the ancient Egyptian civilisation, but the aDNA is not generally well preserved in the harsh Egyptian environment. To overcome this problem, we developed a “capture” method to recover only the mitochondrial genomes from the old Ibis bones. We then analysed the DNA sequences to determine the relationship between the ancient and modern birds.

Using our breakthrough “capture” technique, we successfully recovered aDNA from 14 Sacred Ibis mummies that were approximately 2,500 years ago. When then analysed and compared the genomic variations among Sacred Ibis mummies to those found in modern Sacred Ibis populations from Africa. We found that both mummies and wild birds showed a high level of genetic variation. These results were surprising!

We assumed like others that Ibis were most likely farmed. In that scenario, we thought that the aDNA of mummified birds would be very similar to each other while being quite different from the wild birds. However, the results showed that the mummies genomes were as different from each other as they were from wild African birds. These findings don’t support the suggestion, based on the ancient writings, that there was industrial-scale farming of sacrificial birds.

Based on the results, we suggest that each year priests attracted birds from the wild with food and possibly reared chicks. Moreover, our DNA results indicate that birds were not domesticated, which would have required breeding in captivity over many generations. The rearing is thought to have occurred at natural Ibis habitats close by the temples. The Lake of the Pharaoh in Saqqara is an excellent example of such a location, where the natural basin was filled annually by floodwaters from the Nile River. Our results suggest that the ibises were 'fed' rather than 'bred' specifically to be sacrificed.

We have shown that ancient Egyptian priests likely tamed, rather than farmed Ibis for mummification. Our study demonstrates how modern scientific methods can help us to understand the cultural practices of ancient civilisations. More insights into the possibility of domesticating ancient Egyptian animals, using another model is our future research perspective. While ancient Egyptians mummified different sort of animals, each type was preserved for a different purpose. As unlike the Ibises, some animals were raised in homes as pets, while others were just to be sacrificed.