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# Extinct Penguin Wore Earth Tones, Fossil Shows



"Science"/American Association for the Advancement of Science

A reconstruction of Inkeyacu paracasensis showing recovered elements in white and photographs of the holotype specimen.

By JOHN NOBLE WILFORD  
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Penguins didn't always wear tuxedos.

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At least a large penguin that lived 36 million years ago looked nothing like Fred Astaire stepping out in high society. Nor anything like the house tom all dressed up in black and white with no place to go. Scientists announced Thursday that the fossils of the first extinct penguin to be found with preserved evidence of feathers showed that it had yet to adopt the tuxedo look of living penguins. Its feathers were predominantly reddish brown and shades of gray.

The findings also corroborated previous skeletal evidence that penguins had by then evolved the flippers and body shape for powerful swimming — birds in “aquatic flight,” as scientists characterize their marine behavior. The shapes and dense arrangement of the feathers appeared to stiffen the flippers and streamline and insulate the

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An illustration of Inkayacu paracasensis.

entire body, the researchers said.

For reasons not yet understood, the scientists said, the familiar color pattern of living penguins, dark coat and contrasting white shirt front, is a much more recent innovation, long after they evolved the feathers and anatomy for a life as expert divers and swimmers in frigid water.

“Before this fossil, we had no evidence about the feathers, colors and flipper shapes of ancient penguins,” Julia A. Clarke, a paleontologist at the University of Texas at Austin, said in a statement. She was the lead author of the report describing the discovery online and in Friday’s issue of the journal *Science*.

The fossil specimen was a giant bird about five feet tall that had an exceptionally elongated beak with a grooved tip. Its estimated body mass was twice that of today’s emperor penguin, so it was one of the largest penguins that ever lived. The extinct species has been named *Inkayacu paracasensis*, meaning the water emperor from the Reserva Nacional de Paracus, the place in Peru where the fossils were uncovered.

Dr. Clarke and her colleagues had already established that the Peruvian site held a rich diversity of giant penguin species from the Eocene period, about 36 million to 41 million years ago. She said that further investigations were expected to yield new discoveries to “change our view of not only penguin evolution, but of other marine vertebrates.”

The research on the feathered fossil penguin was supported by the [National Science Foundation](#) and the [National Geographic Society](#).

Although the actual feathers had not survived, distinct impressions of them were left in the stony matrix. The preserved feathering of the left winglike flipper, as well as some of the body cover, was pronounced. To their surprise, the researchers were able to detect in the impressions the microscopic color-imparting structures known as melanosomes.

From a close analysis of the shapes, dimensions and other characteristics of the fossil’s melanosomes, the scientists determined that they were nothing like the large ellipsoidal shape and arrangement of pigmentation packets of living penguins.

Two members of the team, Matthew D. Shawkey and Liliana D’Alba of the University of Akron, compared the fossil specimen’s melanosomes with those of other birds. When there was a close match with well-studied birds, the researchers could then reconstruct the colors of the extinct penguin’s feathers. The *Inkayacu* feathers, they concluded in the report, were “gray or reddish-brown with high probability.”

Scientists said it was not clear when or why penguins acquired their tuxedo appearance.

“Shifts in penguin plumage coloration indicated by the fossil,” Dr. Clarke’s team wrote in the journal report, “may be linked to differences in ecology, thermoregulatory demands” or the introduction of new predators. Specifically, the scientists speculated that changing demands of underwater propulsion affected the melanosomes and that this led to their black and white feathers.

While such discoveries may yield insights into the ecology and behavior of early penguins, Jakob Vinther, a member of the research team who was the first to note the presence of pigmentation cells in fossils, said, “Most of all, I think it is simply just cool to get a look at the color of a remarkable extinct organism.”

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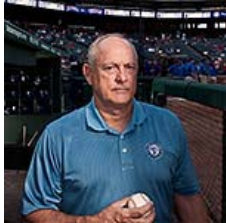
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