Lions' taste for human flesh dissected

Two maneaters devoured dozens in the late nineteenth century but one ate the lion's share.

Lizzie Buchen

A notorious pair of man-eating lions that teamed up to terrify Kenyan labour camps more than 100 years ago did not have the same taste for human flesh, a new study suggests. The findings may reveal unexpected flexibility in lion social relationships.

Between March and December 1898, a pair of male lions killed and devoured 28–135 people in the Tsavo region of Kenya. To understand what happened, Justin Yeakel, an ecologist at the University of California, Santa Cruz, and his colleagues analysed the lions' remains.

The team found that the pair probably consumed about 35 human victims, with one of the animals devouring the lion's share, while the other stuck to a more traditional diet.

"We would expect that if they're within a cooperative coalition, they would be consuming similar things," says Yeakel. "This shows that lion behaviour is even more flexible and complex than we originally thought." It is the first time that different food preferences have been seen within one coalition of social carnivores. The team reports its findings in *Proceedings of the National Academy of Sciences*.

Takeaway food

Lions normally dine on grazing animals such as zebra and wildebeest, but in 1898, drought, pestilence and hunting left the Tsavo region of Kenya barren of the lions' favourite meals. However, the British government was bringing in workers to construct a railway.

The lions dragged people from tents at night, killing 28 labourers and an unknown number of native Taita — estimates range from none to 107. After nine months of this, the beasts were finally killed in December.

Yeakel analysed the ratios of carbon isotopes in the lions' tissues, which should reflect the isotope ratios of their prey. Browsing animals, such as giraffes and antelopes, have different ratios of carbon isotopes to grazers because their food — shrubs and trees versus grasses — carries out different types of photosynthesis.

The team characterized the humans' isotope ratios by taking advantage of "a fluke of history", says team leader Nathaniel Dominy, also at the University of California, Santa Cruz. In the early twentieth century, an archaeologist took more than 100 Taita skulls from Kenyan shrines and
shipped them to England. Yeakel and Dominy accessed these skulls and found that the Taita's ratio of nitrogen isotopes was distinct from the herbivores.

The lions' remains gave Yeakel two time windows of food preferences: the last 2–3 months of the animals' lives, obtained by analysing the quickly regenerating tail tuft hairs, and the lifetime average in bone collagen. He then modelled which prey combinations were most likely to produce the lions' isotope ratios.

The results show that for most of their lives, the maneaters' diets consisted primarily of grazing animals. But in the final months, the authors say, one animal continued to focus on grazers, with an occasional human meal, whereas the other was mainly feasting on browsers and people.

Extrapolating from their isotope ratios, the authors conclude that, over the 9 month period, the lions probably consumed around 10.5 and 24.2 humans, respectively, or around 35 humans total.

**Share and share alike?**

"It's really peculiar," says Dominy. "They were cooperatively hunting but they weren't sharing food."

Dominy says that lions may team up for territorial defence, but such extreme dietary specialization in a cooperative group has not been seen before. Apart from the environmental pressures on the lions, the dominant maneater also had severe wounds in his mouth and jaw, potentially driving him to prey on humans.

"Their divergent diets are mostly relevant for illuminating this one particular case," says Craig Packer, an animal behavioural scientist at the University of Minnesota, Minneapolis, which makes it difficult to extrapolate to other lions.

Stanley Ambrose, an anthropologist at the University of Illinois in Urbana-Champaign, is wary of the conclusions. The different prey possibilities have similar isotope ratios, he says. As a result, "a wide range of proportions of available prey items" could account for the lions' isotope ratios, including "many or no people, even during the period before they became maneaters".

Yeakel acknowledges that there are many possible combinations — the model shows that humans could have made up 4–56% of the dominant maneater's diet, for example — but they do not all have the same probability. Humans probably made up 30% of his diet.

Regardless of the specific numbers, Yeakel says, the findings "highlight the behavioural plasticity that can result when organisms must adapt to a severely changing environment".

**References**


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