

ENVIRONMENTAL SCIENCES

Clues to crime in ivory DNA

Despite substantial attempts to end the global trade in elephant ivory, illegal transnational networks continue to operate. A new study by Wasser and colleagues¹ uses genetic matches between related elephants to reveal the scale, interconnectedness and audacity of traffickers in illegal ivory.

Jennifer Jacquet

Elephant ivory is of little interest to the vast majority of the world once separated from its rightful owner, most probably one of the remaining critically endangered forest elephants or endangered savannah elephants in Africa. However, a small fraction of consumers covets elephant ivory, which in turn leads to poaching. A variety of attempts to end this trade have been put in place, including large-scale burns of confiscated ivory, rangers armed with weapons and drones, and the decision by the Chinese government to ban the domestic ivory trade at the end of 2017. But even illegal markets can cause a population's demise, especially when the consumers and the poachers are not within the same sovereign territory. Elephant ivory remains part of a large illegal, transnational trade network that eludes authorities and threatens the future of African elephants.

Geneticists and wildlife biologists are also taking an interest in tusks — in part because an elephant usually has two of them, which can be used provide new insights into criminal networks¹. Previous work has shown that genotyped tusks can identify from which populations the elephants came, and that identical matches (two tusks from the same individual, but in separate shipments) can be used to identify potentially related shipments². Other research has analysed seizures data³. The latest advance, by Wasser and colleagues¹, introduces the use of genetic matches between tusks from the same individual or close relatives and combines these with physical evidence from seizures — such as port of origin, name of importer or exporter, and phone data — to improve understanding of the wildlife trade, as well as strengthen prosecution evidence.

Combining genetic and physical evidence supports the hypothesis that related elephants appear in large seizures of ivory, and some of this evidence can be matched to the ports where the shipments originated. It also suggests that a small number of transnational criminal organizations are behind the bulk of the ivory shipments.



Credit: Nature Picture Library / Alamy Stock Photo

Three such networks have been identified by previous research: one in Mombasa, Kenya, another in Kampala, Uganda, and another in Lomé, Togo². The new evidence suggests that the criminals in Mombasa and Kampala may be operating as a single large network¹.

The haunting details of this research shows just how bold the criminals can be. Even when the kingpins of certain criminal networks were incarcerated, all three of the networks that they controlled continued to operate. The researchers also found that some of the seizures included ivory with CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) inventory markings, suggesting that the specimens were taken from a government stockpile of ivory in Burundi that was supposedly highly protected. One of the ivory seizures included 12 tons of pangolin scales. These organized criminal networks have shown the ability reorganize operations quickly across the African continent.

These transnational traffickers are up against a brave, transdisciplinary team

of researchers. In their study, they call for increased international collaboration among law enforcement to address these activities, and for prosecutors to consider looking for broad evidence of related crimes rather than a single seizure¹. But as with so many problems we face in the twenty-first century, the insufficiencies are less related to knowledge and more to governance and political will.

Wildlife trafficking is one of the most common illicit activities globally (alongside weapons and human trafficking), and presents a serious threat to biodiversity⁴. What about the role of consumers? When even a minuscule number of humans places extreme value on parts from rare species, their demand can fuel exploitation and make the individual animals or plants more desirable, and more at risk. Researchers refer to this as the anthropogenic Allee effect⁵, which seems to explain the fate of the African forest elephants (*Loxodonta cyclotis*). Forest elephants are rarer than savannah elephants, but disproportionately

represented in ivory seizures¹ because consumers place higher value on the higher-density tusks of forest elephants (and perhaps also on their critically endangered status). Now, Asian elephants in Myanmar are being targeted for their skin:⁶ another rare animal or plant is next.

Wildlife trafficking is a systemic problem that reflects a troublesome relationship with the natural world. The criminals should be prosecuted, but a change in global consciousness is needed to address the heart of this particular issue — one that puts an

end to the commodification, privatization, and ownership of the last pockets of wild animals and nature. □

Jennifer Jacquet^{1,2} ✉

¹*Department of Environmental Studies, New York University, New York, NY, USA.* ²*XE: Experimental Humanities and Social Engagement, New York University, New York, NY, USA.*

✉e-mail: jacquet@nyu.edu

Published online: 10 February 2022

<https://doi.org/10.1038/s41562-021-01268-5>

References

1. Wasser, S. K. et al. *Nat. Hum. Behav.* <https://doi.org/10.1038/s41562-021-01267-6> (2021).
2. Wasser, S. K. et al. *Sci. Adv.* **4**, eaat0625 (2018).
3. Underwood, F. M., Burn, R. W. & Milliken, T. *PLoS ONE* **8**, e76539 (2013).
4. Maxwell, S. L., Fuller, R. A., Brooks, T. M. & Watson, J. E. *Nature* **536**, 143–145 (2016).
5. Courchamp, F. et al. *PLoS Biol.* **4**, e415 (2006).
6. Sampson, C. et al. *PLoS ONE* **13**, e0194113 (2018).

Competing interests

I am the (unpaid) Deputy Director of the Center for Environmental and Animal Protection (CEAP), New York University.