Chimps self-medicate under human pressure

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Chimpanzees living in small fragments of forest close by people and farm animals are turning in increasing numbers to natural remedies in an effort to deal with their stressful and disease-prone existence, a new study suggests.

Scientists already knew the apes respond to seasonal intestinal worm infections by swallowing the leaves of particular forest plants whole. The rough leaves seem to have a purgative effect, causing them to excrete the parasites and soothing sore guts.

But this rudimentary defence mechanism was never meant to handle the kind of pressure that chimps are now facing as human farms and settlements eat into their forest habitat. Stressed by encounters with humans and exposed to new infections, they are self-medicating more than ever, but it doesn't seem to be keeping them healthy.

Researchers focused on chimpanzees living in Bulindi, Uganda, where a few fragments of forest remain amid villages and farmland. They monitored the apes' routes through the forest and regularly sampled their faeces, which they inspected for the whole leaves, as well as intestinal parasites like nematodes and tapeworms.

They found that these so-called 'village chimpanzees' suffer from multiple parasite infestations, and are swallowing leaves far more often in response. 'At other sites it's rare to find the undigested leaves in more than one or two in 100 dung samples,' says Dr Matthew McLennan, a specialist at Oxford Brookes University in interactions between chimps and humans, and the lead author of the paper. 'At Bulindi it was more like one in ten. So it's happening at a different order of frequency than in less disturbed landscapes.'

Leaves from the forest herb Aneilema nyasense. Covered in bristly hairs, the leaves are thought to irritate chimps' guts when swallowed whole, acting as a purgative.

It could be that the chimpanzees are picking up new parasite infections from people and farm animals. In one case, a chimp was found to be carrying a kind of tapeworm normally seen in chickens; McLennan suspects it wasn't truly infected, and had merely preyed on a domestic

fowl not long ago, but this still highlights the potential for chimps to be exposed to new pathogens through contact with human civilisation. He also notes that the risk goes both ways; it's possible that dangerous new diseases could make the leap from chimps to humans when the two species are living cheek by jowl.

It's also possible that the apes simply find existence stressful with their habitat changing so quickly and with so many humans around - aggressive confrontations are increasingly common, and stress is known to make animals' immune systems less effective in many situations. Having the apes living in such small, fragmented areas of forest isn't good either for them or for local people. The chimps can't get enough food in the degraded forest all year round, so when their favoured fruits are out of season they tend to emerge and raid farmers' crops, making off with bananas, sugar cane and other valuable crops.

'It's a bad situation for everyone,' McLennan says. 'People's activities are changing the landscape and affecting the chimps' behaviour - if they can't get enough to eat in the forests, they start looking for food in people's fields. Chimpanzees are big wild animals and can be very dangerous; it's not surprising that local people are afraid of them, so they harass them and try to drive them off. But it turns into a vicious cycle, because it can make the chimps more aggressive.'

McLennan is now planning follow-up research looking in more detail at the health implications of chimps and humans living in close contact for members of both species.

The paper appears in the *American Journal of Primatology*.

More information: High Frequency of Leaf Swallowing and its Relationship to Intestinal Parasite Expulsion in "Village" Chimpanzees at Bulindi, Uganda. Matthew R. Mclennan, Michael A. Huffman. *American*

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