

Elephants found to have the highest volume of daily water loss ever recorded in a land animal

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A team of researchers from Duke University, the University of the Witwatersrand and Hunter College has found that elephants have the highest volume of daily water loss ever recorded in a land animal. In their paper published in the journal *Royal Society Open Science*, the group describes experiments they conducted with captive elephants to measure how much water they lose.

Many animals, such as humans, keep cool in hot weather by perspiring—as sweat evaporates, the skin is cooled down. Other animals, such as dogs, keep cool by panting—and still others, such as [elephants](#), have large organs that work as a cooling system—their ears keep them cool when it is hot. Elephants have sweat glands, as well, but they are small and located in their feet, near their cuticles. Elephants are also known to drink an enormous amount of water—hundreds of liters every day. Such huge amounts of water help to keep elephants cool by its presence in the body, but it is also needed to break down the huge amounts of food that elephants eat—and because their digestion process is so inefficient, they defecate from 12 to 15 times a day. Elephants also lose a lot of water through urinating, as well. Interestingly, until now, it was not known just how much water elephants lose per day. The researchers in this new effort sought to find out.

Rather than trying to measure urine, [water content](#) in feces, water expelled by breathing and via sweat, and other sources of water loss, the researchers added precisely measured doses of deuterium, which dilutes in body water, to the food given to several elephants at a zoo in North Carolina. By periodically taking [blood samples](#), the team could measure how long it took for the elephants to eliminate the deuterium—an indirect way of measuring water loss. The researchers tested the elephants periodically over the course of three years, being sure to include very hot days.

They found that the elephants were losing more water on a daily basis

than previously thought—as much as 325 liters on average on cool days, and as much as 427 liters on average on hot days. The researchers also found that the [water loss](#) on hot days added up to approximately 10% of the total amount of water in an elephant's body on any given day. They suggest that their findings could have implications for the future, as wild elephants face higher temperatures and [water](#) restrictions due to global warming.

More information: Herman Pontzer et al. Air temperature and diet influence body composition and water turnover in zoo-living African elephants (*Loxodonta africana*), *Royal Society Open Science* (2020). [DOI: 10.1098/rsos.201155](https://doi.org/10.1098/rsos.201155)

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