

Stress wrecks male big brown bat fertility during breeding season

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Dead big brown bat (*Eptesicus fuscus*) in Guelph, Ontario, Canada. Credit: Wikimedia Commons, [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

Even on a good day the environment can be wildly unpredictable, from unexpected gusts of wind to food scarcity, and as humans continue to

edge out the natural world, the stress on wild populations is increasing.

"Bats are critical for the maintenance and stability of many terrestrial ecosystems," say Mattina Alonge [University of California, Berkeley (UCB), U.S.] and Lucas Greville (McMaster University, Canada) and the animals are known to be particularly sensitive when under strain. But little was known about the impact that stress might have on their ability to reproduce.

Concerned about the effect of stress on already vulnerable bat populations, Alonge and her colleagues decided to find out how a brief period of stress affected the brains and fertility of male big brown bats (*Eptesicus fuscus*). Alonge, Greville and colleagues have published their discovery that stress has a sudden and dramatic effect on the fertility of male big brown bats during the [breeding season](#) in *Journal of Experimental Biology*.

The team placed the bats lying on their backs for an hour, which is unnatural for the animals, and found that the quantity of the hormone corticosterone—which controls the body's response to [stressful situations](#)—in the young males' blood rocketed more than eight times while their testosterone levels plummeted by approximately 50%.

When the team checked the tubules that produce sperm in the testes, they found those in the stressed bats had shrunk by approximately 25%, reducing their ability to produce sperm, and the testes were five times more sensitive to the stress hormones in the animals' blood.

Next, Alonge and colleagues turned their attention to the bats' brains and found that the stressed animals might be releasing more of a key hormone—RFamide-related peptide—which can reduce an animal's fertility and ability to reproduce. Finally, the team checked the general health of the stressed bats and were surprised that genes involved in

triggering [cell death](#) were active in the testes, suggesting that the animals' reproductive organs were not in great shape after just one hour of stressful conditions.

"The short time frame of the gonadal response in *E. fuscus* is unprecedented in mammals, suggesting that bats are highly sensitive to acute stressors," says Alonge, adding that conservationists need to be aware that male [bats](#) are particularly sensitive to [stress](#) in the run up to the breeding season, which could impact their ability to produce the next generation.

More information: Acute restraint stress rapidly impacts reproductive neuroendocrinology and downstream gonad function in big brown bats (*Eptesicus fuscus*), *Journal of Experimental Biology* (2023). [DOI: 10.1242/jeb.245592](#)

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