

Eavesdropping crickets drop from the sky to evade capture by bats

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A sword-tailed cricket. Credit: Dr. Marc Holderied, University of Bristol

Researchers have uncovered the highly efficient strategy used by a group of crickets to distinguish the calls of predatory bats from the incessant

noises of the nocturnal jungle. The findings, led by scientists at the Universities of Bristol and Graz in Austria and published in *Philosophical Transactions of the Royal Society B*, reveal the crickets eavesdrop on the vocalisations of bats to help them escape their grasp when hunted.

Sword-tailed crickets of Barro Colorado Island, Panama, are quite unlike many of their nocturnal, flying-insect neighbours. Instead of employing a variety of responses to bat calls of varying amplitudes, these crickets simply stop in mid-air, effectively dive-bombing out of harm's way. The higher the bat call amplitude, the longer they cease flight and further they fall. Biologists from Bristol's School of Biological Sciences and Graz's Inst of Zoology discovered why these crickets evolved significantly higher response thresholds than other eared insects.

Within the plethora of jungle sounds, it is important to distinguish possible threats. This is complicated by the cacophony of katydid (bush-[cricket](#)) calls, which are acoustically similar to bat calls and form 98 per cent of high-frequency background noise in a nocturnal rainforest. Consequently, sword-tailed crickets need to employ a reliable method to distinguish between calls of predatory bats and harmless katydids.

Responding only to ultrasonic calls above a high-amplitude threshold is their solution to this evolutionary challenge. Firstly, it allows the crickets to completely avoid accidentally responding to katydids. Secondly, they do not respond to all bat calls but only sufficiently loud ones, which indicates the bat is within seven metres of the insect. This is the exact distance at which a bat can detect the echo of the crickets, which ensures the crickets only respond to bats that have already detected them when trying to evade capture.

This type of approach is rare in nature with most other eavesdropping

insects living in less noisy environments being able to rely on differences in call patterns to distinguish bat predators.

Dr. Marc Holderied, senior author on the study from Bristol's School of Biological Sciences, explained: "The beauty of this simple avoidance rule is how the crickets respond at call amplitudes that exactly match the distance over which [bats](#) would detect them anyway—in their noisy world it pays to only respond when it really counts."

More information: Decision making in the face of a deadly predator: high amplitude behavioural thresholds can be adaptive for rainforest crickets under high background noise levels, *Philosophical Transactions of the Royal Society B* (2020). [dx.doi.org/10.1098/rstb.2019.0471](https://doi.org/10.1098/rstb.2019.0471)

Provided by University of Bristol

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