

Moths mimic sounds to survive

May 31 2007

In a night sky filled with hungry bats, good-tasting moths increase their chances of survival by mimicking the sounds of their bad-tasting cousins, according to a new Wake Forest University study.

Published in the May 29 issue of the Proceedings of the National Academy of Sciences, the study is the first to definitively show how an animal species uses acoustic mimicry as a defensive strategy.

The research was conducted by Jesse Barber, a doctoral student in biology at Wake Forest. William E. Conner, professor of biology at Wake Forest, co-authored the study.

In response to the sonar that bats use to locate prey, the tiger moths make ultrasonic clicks of their own. They broadcast the clicks from a paired set of structures called “tymbals.” Many species of tiger moth use the tymbals to make specific sounds that warn the bat of their bad taste. Other species make sounds that closely mimic those high-frequency sounds.

“We found that the bats do not eat the good-tasting moths that make the similar sounds,” said Barber, who has worked on this research for four years.

In the study, other types of moths that were similar in size to the sound-emitting moths, but did not make sounds, were gobbled up by the bats.

The researcher trained free-flying bats to hunt moths in view of two high-

speed infrared video cameras to record predator-prey interactions that occur in fractions of a second. He also recorded the sounds emitted from each moth, as well as the sounds made by the bats.

All the bats quickly learned to avoid the noxious moths first offered to them, associating the warning sounds with bad taste. They then avoided a second sound-producing species even though it was not chemically protected. This is similar to the way birds avoid butterflies that look like the bad-tasting Monarch.

The two species of bats used were big brown bats and red bats. Barber raised the bats in the lab so behavior learned in the wild would not influence the results of the experiment.

Barber said anecdotal observations have suggested that animals such as snakes, owls and bees use acoustic mimicry. This study takes the next step and provides the definitive experimental evidence for how mimicking sounds helps an animal survive.

Source: Wake Forest University

Citation: Moths mimic sounds to survive (2007, May 31) retrieved 23 April 2024 from <https://phys.org/news/2007-05-moths-mimic-survive.html>

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