Caught in the act: Bats use the sound of copulating flies as a cue for foraging

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These are copulating house flies (*Musca domestica*). Credit: Stefan Greif/MPI for Ornithology

Mating at night does not necessarily lead to offspring, at least in flies: males produce a buzzing sound with their wings that can be perceived by bats. Stefan Greif from the Max Planck Institute for Ornithology, and colleagues, observed this in a long-term study on wild Natterer's bats that eat the copulating flies in a double-sized meal. Flies that were just sitting or walking on the ceiling did not elicit a predatory response by the bats. This is the first experimental evidence how mating itself can be risky.

Mating activities are a dangerous business because the attention to other important events in the surroundings is often reduced. Therefore the duration of copulation itself is usually very short. About 100 years ago

researchers argued that copulating animals are at a higher risk of being discovered and, consequently, being eaten by a predator. Yet, surprisingly, there are only few observations that support this hypothesis. These examples comprise studies in water-living insects, such as amphipods and water striders, and also in land insects, as investigated in a recent study in Australian plague locusts that are at a higher risk of being eaten as mating pairs compared to single animals.

This is a pair of Natterer's bats. Credit: Stefan Greif/MPI for Ornithology

Apart from decreased attention, a reduced flight response as well as an enhanced conspicuousness induces a higher risk for these winged lovers to be easy prey. Stefan Greif from the Max Planck Institute for Ornithology, and colleagues, have now provided experimental proof for this phenomenon. In a community of house flies and Natterer's bats in a cowshed near Marburg, Germany, they analysed videotapes of the movements of almost 9000 flies. The researchers found that the flies rarely fly at night and mostly sit or run on the ceiling. Finding the flies by echolocation is nearly impossible for the bats as the faint insect echo is completely masked by the strong background echo which makes them virtually "invisible".

This scenario completely changes when the male flies find a suitable mating partner. The subsequent copulation is a noisy event because males then produce broadband buzzing sounds that can be heard by the bats. Around five per cent of the fly pairs that engage in copulation were attacked and mostly eaten by the bats (across four observation years, even 26 per cent of the observed copulating pairs were attacked).

In order to provide evidence that it is really the sound that makes the flies detectable for the bats, the researchers mounted dead, noiseless fly pairs on the shed ceiling in a position they usually take during copulation. These exhibits provide a larger reflection area for echolocation of the bats compared to a single fly. However, they were never attacked by the bats. Only when the researchers played back the copulation sounds of the flies, did the bats try to attack the loudspeakers. Accordingly Stefan Greif summarizes the results of the study in a simplistic way: "sex kills".

More information: Björn M. Siemers, Eva Kriner, Ingrid Kaipf, Matthias Simon and Stefan Greif, Caught in the act: Bats eavesdrop on the sound of copulating flies. *Current Biology*, published online on June, 24, 2012.

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