

## Battle of the sexes offers evolutionary insights

May 3 2012



Karl Grieshop uses a precision laser system to trim the claw-like spines of male fruit flies. In a paper published May 3 in the journal *Evolution*, University of Cincinnati graduate student Karl Grieshop and Michal Polak, associate professor of biological sciences at UC, examine the role of genital spines in the reproductive success of a species of fruit fly. Credit: Jay Yocis, University of Cincinnati

In a paper published May 3, in the journal *Evolution*, University of Cincinnati graduate student Karl Grieshop and Michal Polak, associate professor of biological sciences at UC, examine the role of genital spines in the reproductive success of a species of fruit fly. Their investigation identifies the specific type of advantage these spines bestow in the competition to reproduce.

"The leading hypothesis to explain the remarkable diversification of



male genital traits is that such complexity evolves in response to <u>sexual</u> <u>selection</u>," Grieshop said. "Specifically, mechanisms of sexual selection operating during and after mating, such as sperm competition and cryptic female choice, have received the most support."

Grieshop and Polak have found compelling evidence that the spiny genitals of these male <u>fruit flies</u> provide the most benefit before the sexual act, rather than during mating or afterward. They achieved this understanding by using a precision laser surgery system to trim the clawlike spines of hundreds of male fruit flies and monitoring their success in a variety of mating situations.

Of the many species of fruit fly, they chose Drosophila ananassae because of the extraordinary length of these males' genital spines. Using the laser system, they removed the spines completely from some males, cut the spines in half on others, and merely blunted the spine tips on the final group.

Grieshop and Polak discovered that males with their spines completely removed were unable to copulate at all. Males with spines cut in half saw a profound reduction in sexual success. Those whose spines were merely blunted suffered a slight, non-significant reduction in copulation success, which was intensified to a statistically significant effect in sexually competitive environments. They likewise found the decrease in copulation success of partial-cut males was much stronger in competitive environments. And, it is in competitive environments where fruit flies most often mate.

"The mating system of these flies is best described as 'scramble competition," Grieshop said. "They swarm on rotting fruit. Some females are receptive. Others are not. The premium goes to males that can mate efficiently with many females before they are usurped by sexual rivals"



In such a chaotic environment females are known to exercise choice prior to mating according to the scent of pheromones, sounds of mating calls, or the visual cues of courtship dances, Grieshop said. But with regard to the surgical treatments of these genital spines, females apparently do not discriminate between competing male treatments.

"It appears that these spines promote male copulation success in this sort of environment," Grieshop said. "Identifying the precise function of a trait that varies across species, such as these <u>spines</u>, provides insight into the evolutionary pressures that caused them to evolve and also how new species may arise. Most adaptive functions of genitalia so far discovered only make a difference after mating has begun. For genitalia to make a difference before copulation is unusual. This puts genital traits on the same playing field as so-called 'secondary sexual traits,' like coloration or other adornments."

The research, he said, encourages the scientific community to consider male genital trait evolution as being similar to that of secondary sexual traits, which may facilitate the understanding of one of the greatest unknowns in evolutionary biology: why male genitalia are so incredibly variable across species.

Provided by University of Cincinnati

Citation: Battle of the sexes offers evolutionary insights (2012, May 3) retrieved 4 June 2024 from <u>https://phys.org/news/2012-05-sexes-evolutionary-insights.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.