Exposure to parasites may have greater negative effect than previously thought

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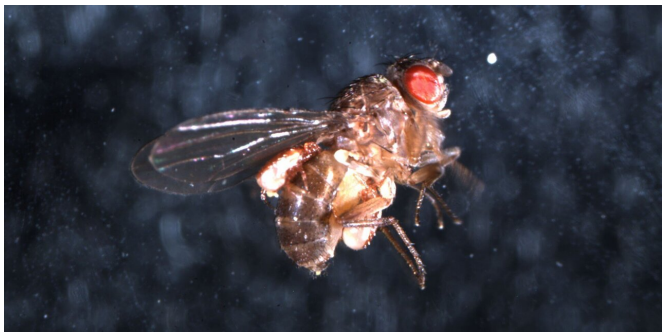

Fruit flies have more to fear than just infection by parasitic mites, like the one pictured here, according to new U of A research. Credit: Lien Luong

The mere presence of parasites can have a negative effect on hosts, according to new research by University of Alberta parasitologists.

The study, led by U of A associate professor Lien Luong, examined the effects on fruit flies living among parasitic mites. It found that flies exposed to, but not infected by parasitic mites expend more energy, have a shorter lifespan, and produce fewer offspring than those that are not.

"For fruit flies and other organisms, there are costs associated with just living in an infectious world—even if you're not actually infected," said Luong. "And these indirect costs can have long-term consequences."

An infectious environment

The research illustrates a concept called the ecology of fear, and is one of the first studies to show this phenomenon at play in the relationship between parasites and host organisms.

Environmental indicators of predators or parasites, including smells, sounds and visuals, can result in consequences for prey or host animals, including changed foraging behaviour and habitat use, and in the case of fruit flies, behavioural and physiological changes.

"We found that flies that lived near mites had reduced longevity, or didn't live as long, and produced fewer offspring than those who did not live near mites," explained Luong.

"We also saw an increased metabolic rate, which makes sense. Using energy in response to nearby parasites means having less energy for other important activities, such as foraging for food or reproducing."

The results demonstrate that we may have underestimated the impact of parasites on host populations, said Luong who added that when we think about infectious disease, we generally think about the effects in terms of host morbidity and mortality—the direct effects of becoming infected.

"This study shows that indirect effects have a fitness cost, which suggests that the negative impact of parasites is even greater than we have previously predicted," he explained.

The paper, "Ecology of fear: environment-dependent parasite avoidance among ovipositing *Drosophila*," was published in *Parasitology*.

More information: Monika K. Mierzejewski et al. Ecology of fear: environment-dependent parasite avoidance among ovipositing Drosophila, *Parasitology* (2019). DOI: 10.1017/S0031182019000854

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