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# Parasite infiltrates fruitfly research

## LONDON

An unnoticed parasite could be scuppering fly geneticists' experiments. Up to a third of laboratory strains of their favourite test organism — the fruitfly *Drosophila melanogaster* — are infected with a parasite that affects the flies' biology, according to a study of hundreds of stocks of the fly. The finding suggests that the bacterium could be silently affecting the outcome of a significant number of studies.

The parasite, *Wolbachia*, can only be transmitted through infected eggs, and has evolved strategies for maximizing its transmission, such as switching the sex of male embryos. It can reduce *Drosophila* sperm and egg production, influence longevity and — critically for experiments — shelter its host from the effects of harmful mutations.

One mutation in a gene called *Sex-lethal* prevents female flies from producing eggs, for example, but *Wolbachia*-infected females carrying this mutation produce near-normal numbers of eggs<sup>1</sup>. Certain strains with differing lifespans live for the same length of time after being treated with the antibiotic tetracycline, which kills *Wolbachia*<sup>2</sup>.

Yet *Drosophila* researchers rarely consider *Wolbachia*'s effects, according to Timothy Karr of the University of Bath, UK. "It's amazing how many people don't know this," he says.

Karr and his team surveyed 609 of the

mutant strains housed at the Bloomington Stock Center at Indiana University for *Wolbachia* genes. They picked a wide range that included strains with large DNA deletions called deficiencies, smaller 'point' mutations, and mutations created with mobile pieces of DNA called P-elements, as well as normal, or 'wild-type', stocks. Some 30% of strains were infected, they reported<sup>3</sup>.

The team also discovered an unidentified mutation that kills flies when combined with another mutation called *chico*. But with the parasite present, such flies survive. "Now you have a new mutant that should have killed the fly," says Karr. "*Wolbachia* is keeping it alive."

Finally, they studied the distribution of the bacteria in fly larvae, and found that every tissue was infected. "It raises the bar of the alarm," says Karr. In theory this could affect any characteristic, he warns.

It looks as though no *Drosophila* geneticist can afford to ignore the possibility of *Wolbachia* influencing their results. "Now the paper is coming out, people are going to have to deal with it," says Karr. "It remains an open question how much of an effect there will be."

Other researchers say Karr's findings are important, but *Drosophila* genetics is not in any kind of crisis. "These are complicated animals," says Gerry Rubin, a *Drosophila* geneti-

cist based at the Howard Hughes Medical Institute near Washington DC. The idea that an environmental factor could be affecting the flies' biology is nothing new, he says. "It isn't the first thing we didn't know about and it won't be the last." Knowing about these effects means researchers can now take them into account in experiments. "You can't control for things you don't know about," Rubin says.

Kathy Matthews, co-director of the Bloomington collection, says there are no plans to 'cure' the infected stocks with antibiotics. "This paper will help alert *Drosophila* researchers to the possibility of the presence of *Wolbachia* in any given stock, which is certainly a good thing," she told *Nature*. "But we view it more as a useful point of information about *Drosophila* biology than a call to arms."

That's good news for Karr, who sees the infected strains as a tremendous resource for probing the interaction between *Wolbachia* and its host, and perhaps for learning about how parasites make the transition to becoming symbionts. He also hopes to undertake a systematic study of all the mutants at Bloomington, comparing cured with uncured lines to see how they are affected by the parasite. ■

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2. Driver, C., Georgioui, A. & Georgioui, G. *BioGerontology* **5**, 185-192 (2004).
3. Clark, M. E., Anderson, C., Cande, J. & Karr, T. L. *Genetics* doi:10.1534/genetics.104.038901 (2005).