



Stephen L. Doggett

Fruit Flies as Potential Vectors of Food-Borne Illnesses

New research showing the dangers of these flies

David Lilly & John Barcay

Fruit flies (*Drosophila* spp.), also known as ‘Vinegar flies’, have long been a source of annoyance for restaurants and bars. But new research shows that these tiny pests can potentially play a greater role in spreading illness-inducing bacterial pathogens to food and food preparation surfaces.

The study, conducted by Ecolab scientists, was recently published in the *Journal of Food Protection* (Black *et al.*, 2018) and presented at the 2019 FAOPMA-Pest Summit in Shenzhen, China, by Dr. David Lilly. The study found evidence of fruit flies’ ability to transfer harmful bacteria from a contaminated source to surfaces or ready-to-eat food. Fruit flies are present in more than half of foodservice facilities, according to data collected by Ecolab’s field team, which provides both comprehensive and localized treatment options for small flies.

In laboratory experiments, the researchers used specially made fly enclosures to assess fruit flies’ ability to transfer *Escherichia coli*, *Salmonella* and *Listeria* bacteria from a contaminated food source to surfaces of the enclosures. They also examined fruit flies’ ability to transfer *E. coli* from a contaminated food source to non-contaminated foods. Finally, the researchers investigated fruit flies’ capacity to carry bacteria – and the location on their bodies where they are most likely to carry the microorganisms.

Results showed that fruit flies are capable of transferring *E. coli*, *Salmonella* and *Listeria* to surfaces and relocating *E. coli* from a contaminated source to fresh, ready-to-eat food. The data showed that, on average, a fruit fly had the capacity to carry 1,000 (range 150

– 10,000) ‘foreign’ bacteria – microorganisms that are not part of their natural flora. Soil, biofilm and bacteria were found on fruit fly tarsal and leg areas. In presenting the research, Dr. Lilly explained that “The presence of even a small number of pathogenic foodborne bacteria transferred by fruit flies to food preparation surfaces or ready-to-eat foods can lead to a high probability of infection. This research confirms that the risk of fruit flies to food safety is as threatening as that of other pests, such as cockroaches, rodents and house flies.”

Study co-investigators Elaine Black, Jerry Hinrichs, Douglas Gardner and John Barcay conclude that food operators can reduce the risk by being prudent in eliminating fruit flies through proper cleaning and sanitizing of potential breeding sites. Those sites – generally anywhere food debris and aqueous fluids can collect and stagnate – include floor drains, drain lines from drink dispensing equipment, and poorly maintained floors. ■

Reference: Black, E. P., Hinrichs, G. J., Barcay, S. J., & Gardner, D. B. (2018). Fruit flies as potential vectors of foodborne illness. *Journal of Food Protection*, 81(3), 509-514).

Dr David Lilly is a Lead Entomologist for Ecolab’s Global Pest Elimination - RD&E Division, and Associate Editor of the FAOPMA Magazine.

Email: david.lilly@ecolab.com

Dr John Barcay is Senior Scientist for Ecolab’s Global Pest Elimination - RD&E Division, based out of St Paul, Minnesota.