

# Insec(tc)ure\*:

## Are you insecure about your insect cures?

A UT Urban IPM Lab Newsletter for the Pest Management Industry

### Cats and Dogs Are Not a Common Bed Bug Host in High Rises for the Elderly

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In 2013 and 2014, my UT Urban IPM Lab evaluated the use of bed bug monitors in low-income, high rises for the elderly and disabled. We determined that inspection of one, two or four BlackOut Bedbug Detectors or Insect Interceptors BG per apartment detected bed bugs in 80 – 90% of the infested apartments in 3 – 4 weeks (Vail and Chandler 2017). Bed bugs from these buildings were preserved in ethanol for future studies. I present here the results of one of the subsequent studies.

Nearly four years ago, we hired a freshman majoring in animal science to rear the bed bugs in our lab. Marlo Black's love of animals was evident and she also had a keen interest in insects, a rare combination. We soon realized that Marlo was exceptional and decided that a research study to determine whether cats and dogs commonly served as bed bug hosts when living with humans would encompass her two interests (Black et al. 2021).

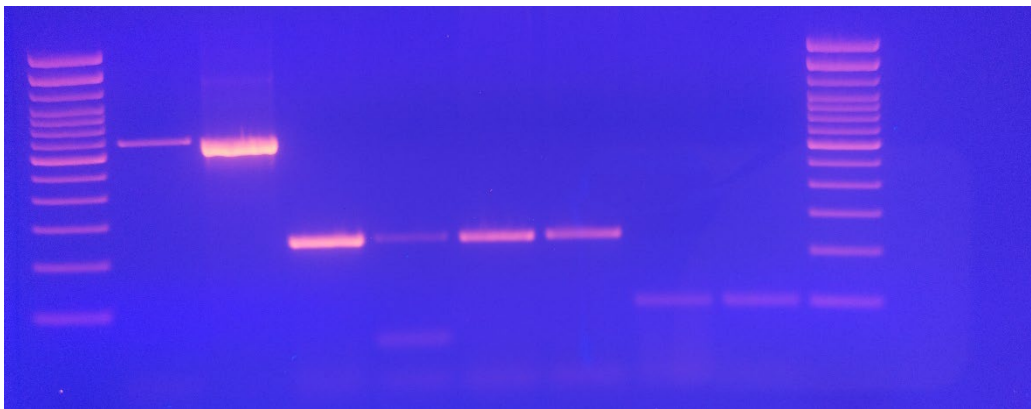


Figure 1. An agarose gel with visualization of the PCR amplicons. DNA ladders are found in columns 1 and 10; dog amplicons in columns 2 and 3; human amplicons in columns 4 - 7; and cat amplicons in columns 8 and 9.

Thanks to Jennifer Chandler's meticulous notes from our original high-rise study, we were able to select bed bugs from six apartments with dogs, five with cats, and one with a cat and dog. Humans were present in all of these apartments. Twenty bed bugs collected in the 2013-14 study were selected from each of these 12 apartments by first choosing the largest engorged

bed bugs assuming they held the most blood and would be the easiest to identify their host(s). Hosts were identified using molecular techniques as had been previously done by others to identify mosquito bloodmeals.

What were the results? Bed bugs fed predominantly on humans. Of the 228 bed bug samples, human hosts were identified in 158 (69.3%), dog hosts in 7 (3.1%), and cat hosts in 1 (0.4%). Six of the seven bed bugs that had fed on dogs also had fed on humans. These seven dog-fed bed bugs were collected from five different apartments. No host was identified in 68 or 36.8% of the bed bugs.

What does this mean? Although most bed bugs fed on humans, they also fed on other animals, but it's doubtful these companion animals maintain bed bug populations. More studies are needed to determine how well bed bugs develop

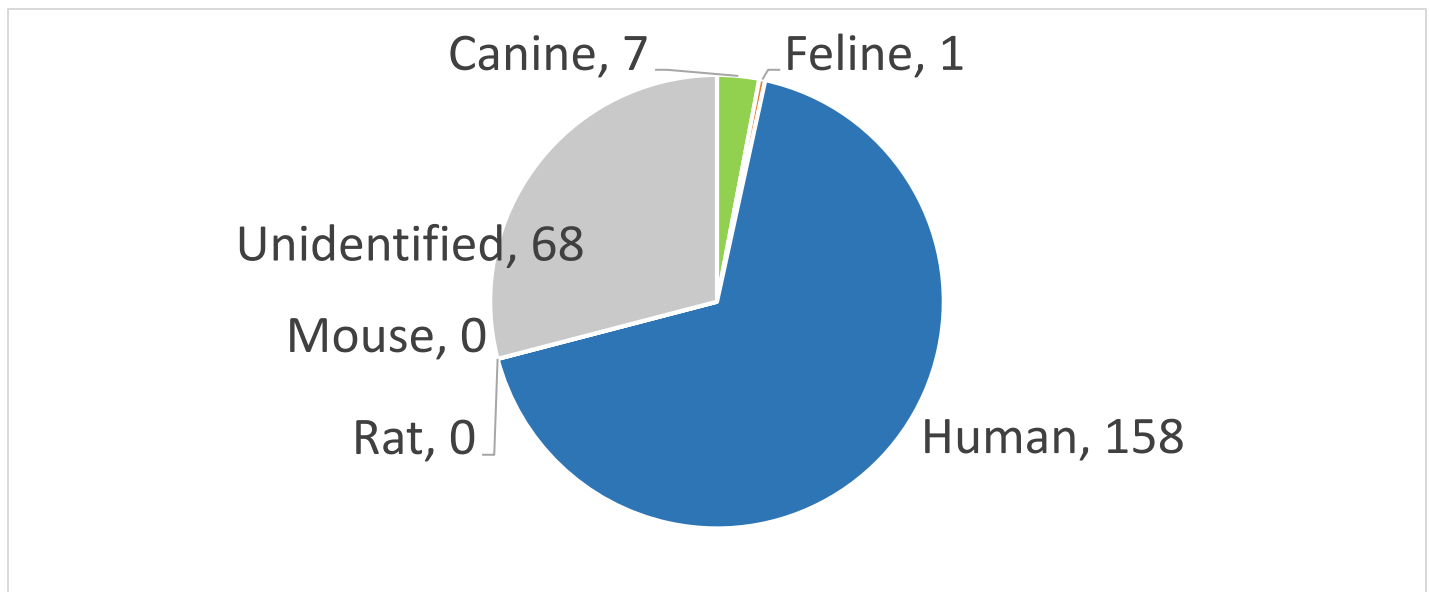


Figure 2. Bed bugs fed predominantly on humans. Of the 228 bed bugs sampled, 69.5% fed on humans, 3.1% fed on dog, 0.4% fed on cats and 0% fed on Norway rats or house mice. Host was undetermined in 36.8% of the samples.

and reproduce when feeding on dogs. While bed bugs did not regularly feed on dogs, this study indicates they may still use them as a host. Future studies should examine if humans are preferred or whether bed bugs are opportunistically feeding on dogs.

Other reasons we detected fewer dog-fed or cat-fed bed bugs might be due to grooming behaviors or parasiticides. In our study and another by Potts et al. 2021, a cat was detected as a host at a meager rate - in one bed bug in one apartment. Cats are excellent groomers and may have eaten or killed the bed bugs before they could be collected for our studies. In addition, parasiticides may have prevented the bed bugs that had fed on companion animals from being collected in the original study. Results from several studies have shown the adverse effects of parasiticides on bed bugs. In one study bed bugs fed on dogs after the canines had consumed a chewable form of afoxalaner, an insecticide used to control fleas and ticks. Bed bug death ranged from 64 to 85% over 28 days post-treatment (Beugnet et al. 2021). We need more research to determine the effects of pet parasiticides on bed bug populations when companion animals and humans live together and how parasiticides could potentially be used in pest management programs.

Our study was conducted in low-income high rises for the elderly, which may differ from other living environments. Low-income elderly residents may be less likely to purchase and use parasiticides. Dogs in single-family homes may be more likely to be present in the structure without a human or another host for more extended periods than homes for the elderly and disabled. Thus, bed bugs might be more likely to feed on a dog in single-family homes and other environments.

Because we did not detect a host in 36.8% of the bed bugs sampled, we also investigated if the bed bugs in our study fed on Norway rats or house mice by using the same techniques mentioned above but with primers for mouse and rat. No rat or mouse host was detected. Although we were unaware of the mouse or rat populations in these high rises, another study conducted in a high rise with an established mouse infestation, also failed to detect house mouse hosts (Potts et al. 2021). So it would seem that rodents are not common hosts either.

In conclusion, in low-income high-rises for the elderly and disabled, bed bugs frequently fed on human hosts and rarely on cats and dogs. More research is needed to determine if these trends hold up in other environments and under known use of parasiticides.

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