



# Bed Bug Fundamentals

---

Prepared for the Michigan House of Representatives, Health Policy Committee by:

**Mark D. Sheperdigian, BCE**

Vice President Technical Services

Rose Pest Solutions

- **The most common cause of bed bug infestations in homes/apartments is bugs being brought in on people and belongings.**
- **Nobody knowingly/willingly brings loose bed bugs into their own home.**
- **Bed bug infestations in apartments may originate from one or just a few bed bugs, BUT many bugs may need to be introduced before an infestation begins.**
- **By the time bed bugs are discovered, they have become established.**
- **Bed bugs *seem* to stay put until their populations reach a certain level.**
- **Once the population gets large, bed bugs will disperse of their own accord and can travel between apartments.**
- **Once a bed bug infestation “explodes” (reaches alarming proportions), they will be transported off the premises by nearly every person and item that spends time in that environment.**
- **There is evidence to suggest that most of the bed bugs that carried off (individually or in small groups) from a heavy infestation will not survive to begin an infestation.**
- **The cause of an ongoing presence of bed bugs in an apartment may be due to ineffective treatment methods, inadequate preparation for treatment, or the reintroduction of live bed bugs or a combination thereof. There is no practical method to determine which of these causes is responsible.**
- **The key to managing the cost of bed bug control is prevention and early detection.**

Details:

- **The most common cause of bed bug infestations in homes/apartments is bugs being brought in on people and belongings.**
  - Bed bugs brought in on clothing or belongings can start an infestation if they can find the proper conditions (harborage, regular meal, a suitable mate).
  - A single bed bug can start an infestation only if it is a mated adult female.
  - Entire infestations can be brought in infested furniture or other items.
    - Discarded furniture/goods
    - Re-sale furniture/goods
    - Charitable distributions
  - A bed bug infestation should be defined as a breeding population of bed bugs containing multiple adults and immature stages and viable eggs.
  - A single bed bug or a few individuals with no active breeding occurring should be defined as introductions.
  
- **Nobody willingly brings loose bed bugs into their own home.**
  - Some cultures have come to accept bed bugs as a part of life as many of our forefathers did. These people may not be all that mindful of bed bugs in their belongings when they move.
  - All manner of mental illness and self-destructive behavior exists and there will be some exceptions to this.
  - Many people do not suffer any physical expression of a bed bug bite and the bugs may not be such a big deal to them. These people may move bed bugs without knowing.
  
- **Bed bug infestations in apartments may originate from one or just a few bed bugs, BUT many bugs may need to be introduced before an infestation begins.**
  - Ongoing studies at the North Carolina State University have shown bed bugs collected from infested apartments are all related to one or a few progenitors.
  - Some of the buildings in the studies showed that all the bugs in the building were descended from the same original bugs. This indicates that the bugs in all the infested apartments were related to each other and all the infested apartments were the result of one original infestation.

- **By the time bed bugs are discovered, they have become established.**
  - Bed bugs are “cryptobiotic” and spend most of their time hiding in cracks, seams, and other dark places. They come out to feed normally at night or at least when the environment is quiet. In “exploded” populations, bed bugs may be seen at any time of the day in virtually any area of the home.
  - Most people cannot feel a bed bug biting; many people don’t even get an itchy red bump.
  - Of those people that do develop a “bite”, it may not appear for day or two or longer making it difficult to determine when and how the “bite” was acquired.
  - New infestations in homes where people do show bites are often attributed to a wide variety of causes before bed bugs are even suspected. This is even more common in communities where bed bugs are not yet widespread.
  
- **Bed bugs seem to stay put until their populations reach a certain level.**
  - There are studies being done to get answers, but this aspect of bed bug behavior is not yet well understood.
  - Should this prove to be true, it will indicate that apartment dwellers are not at risk from a light to moderate infestation in an adjacent apartment.
  
- **Once the population gets large, bed bugs will disperse of their own accord and can travel between apartments.**
  - Studies done at Rutgers have demonstrated that bugs from a heavily infested unit will show up next door, across the hall, and in adjacent units over or under the apartment in question.
  
- **Once a bed bug infestation “explodes” (reaches alarming proportions), they will be transported off the premises by nearly every person and item that spends time in that environment.**
  - Bed bugs are not *invisible*, but the early stages are quite small and a newly hatched bed bug is so small it may escape detection by even a trained eye.
  - There is evidence to suggest that that most of these bed bugs being transported out of the heavily infested home will not survive to start an infestation.

- **The cause of an ongoing presence of bed bugs in an apartment may be due to: 1) ineffective treatment methods, 2) inadequate preparation for treatment, or 3) the reintroduction of live bed bugs or a combination thereof. There is no practical method to determine which of these causes is responsible.**
  - The reintroduction of bed bugs can occur if:
    - The tenant brings them from a heavily infested environment.
    - A regular visitor comes from a heavily infested environment.
    - An adjacent apartment has a heavy or “exploded” population.
  
- **The key to managing the cost of bed bug control is prevention and early detection.**
  - The most efficient method to detect low levels of bed bugs is a properly trained canine scent detection team.
  - While not perfect, a canine team can detect bed bugs at an extraordinary level of accuracy in a fraction of the time required for a visual inspection performed by trained professionals.
    - Properly trained dogs can:
      - Detect a single newly hatched bed bug or a single viable egg.
      - Discriminate between live bed bugs and dead bed bugs.  
*Note: they may not be able to discriminate between a bug dead only two days dead or less.*
      - Discriminate between viable and non-viable eggs.
    - It is possible that the humans involved cannot find the bed bug(s) even after they have been detected by the dog.
    - It is possible that the dog has alerted yet there are no bed bugs in the area.
    - It is possible that there indeed bed bugs but the dog does not alert.
  - Bed bug traps and other devices claim to be able to detect bed bugs at low levels, but studies involving their use indicate that a protracted period of time (2 weeks) may be required for accurate results.

This single bed bug cannot be considered an infestation. This male adult bed bug was found behind the headboard in a 4-star hotel. It may bite guests some of whom may even show a bite, but with no adult female present, no breeding population can be formed.

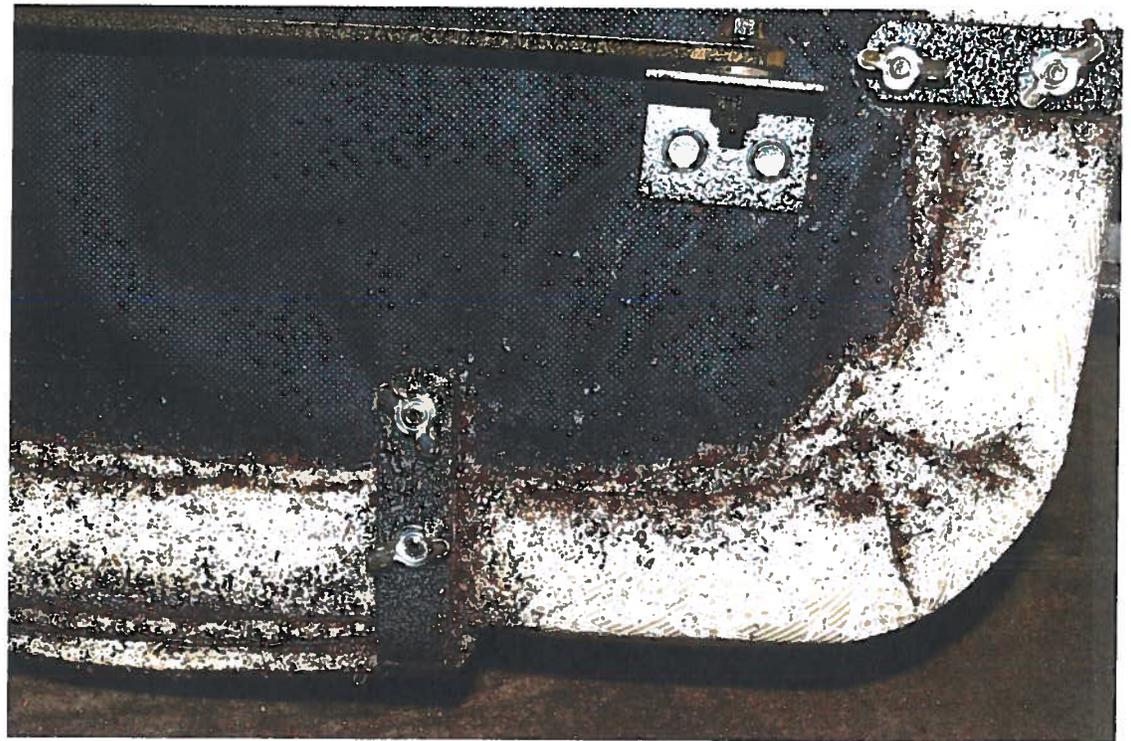


This is a light infestation. That shows an adult female surrounded by developing young and viable eggs that will hatch into young within 7-10 days. The eggs are difficult to spot on the light background.



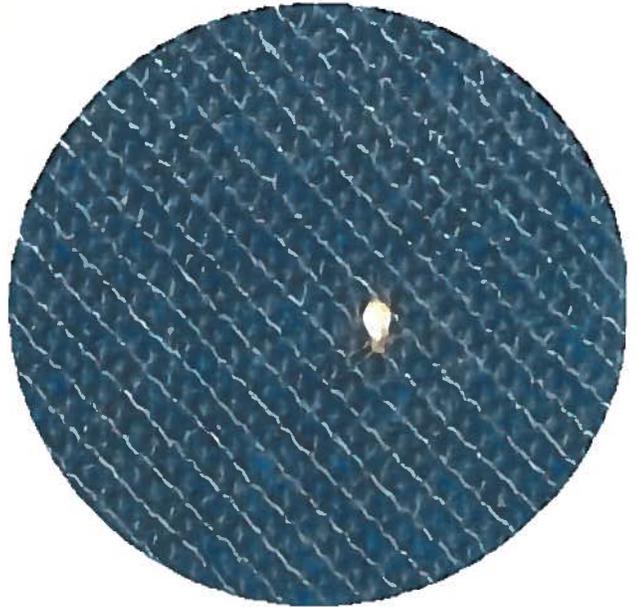
This is a heavy infestation and shows many bugs in all stages of development spreading out around the bed in which they live.

This is an exploded population. 10,000s perhaps 100,000s of bed bugs live in this condominium feeding on elderly gentleman





Bed bugs transported on shoe (left) and on clothing (below) from environment with an “exploded” population.



Bed bug eggs on the inside of a guitar case that sat in the closet of a teenager living in a heavily infested home.