



“Tell me and I forget, teach me and I may remember, involve me and I learn.” – Benjamin Franklin

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BED BUGS... BEEN AROUND FOR A BIT

- "Sleep tight, Don't let the bedbugs bite" first appears in the 1896 book "What They Say in New England: A Book of Signs, Sayings, and Superstitions"

120YRS
- Assumption Of St. John 1320; "he sat up on the bed and looked at them"the bed, the bugs running from the door hasted to the bed and climbed up by the legs thereof and disappeared into the joints."

705YRS
- 423BC, Ancient Greek playwright Aristophanes wrote about them in two plays.

2,440YRS
- Archaeologists have found fossilized bed bugs in human dwellings in Egypt.

3,530YRS

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2005



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1999-2009
The Decade Of
Misunderstanding

Microsoft Digital Commons Images

2003



Newark Times Ledger

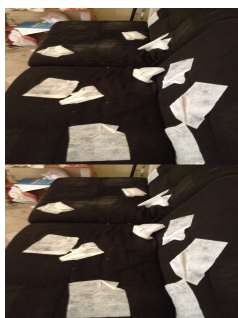
This Guy
Was Our
Treatment
Expert



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Place some scented dryer sheets on the surface of mattresses, inside your pillowcase and between the box spring and mattress. It can be used as a protection against bugs, as odour of the sheets is repulsive to them. You can spread the sheet over the furniture so that bed bugs become nauseous and shun the living area.



Bounce bed bugs right
out of your home!



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Bedbugs are like cooties!



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PROOF THAT PEOPLE ARE THE REASON WHY
BED BUGS WILL NEVER GO AWAY



“These things are vicious. Never did I realize as a child what my father and grandmother would tease me about before going to bed would actually come true.

Unfortunately, you cannot see them and when you are tired from walking all day you ignore them till the morning when the bites inflame your entire body and make traveling not fun.

There is no hitting them with your shoe, the only one who is black and blue is me.”

Personal web site travel blog showing this persons travel in Europe.



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WHY THE SOCIETAL RESURGENCES?

- ✓ Accelerated tourism, business, military travel, nomadic lifestyles, etc.
- ✓ Population growth + urbanization
- ✓ Immigration (legal + illegal)
- ✓ Slumlords + DIY mentality
- ✓ “Lowest responsible bidder” by government agencies
- ✓ Less pesticides being used in interior areas
- ✓ Lack of education & awareness
- ✓ Communal cultures
- ✓ People are lazy + socialization

Bed Bugs Do As Humans Do!

Bed Bugs Are Back
Post COVID

LOCAL NEWS

Inspectors find bed bugs
at several Las Vegas
Strip hotels





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BED BUG VS. BAT BUG
CIMEX LECTULARIUS VS. CIMEX ADJUNCTUS



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- > A bat bug is a bed bug on vacation....no shaving all week.
- > 99% of the time you are dealing w/bed bugs, positive ID always.
- > Residential & condo's you are likely to find *adjunctus*.
- > If insects are found in weird places (bathroom, closets, kitchen) = *adjunctus*.
- > With *adjunctus* sell bat proofing w/void-attic treatments. Treatment is much different than *lectularius*.



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Study Examines Bed Bug Movement Between Apartments

Rutgers University researchers, Drs. Richard Cooper, Changlu Wang, and Narinderpal Singh, investigated bed bug movement within and between apartments to see how far bed bugs moved in this setting.

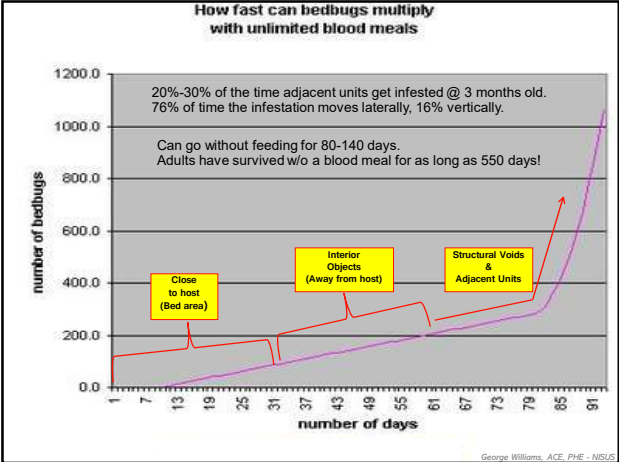
September 23, 2015

- M-R-R method: Mark, release, recapture.
- Marked bed bugs were recovered in 5-6 neighboring apartments.
- Extensive movement of marked bed bugs within and between apartments occurred regardless of the number of bed bugs released or presence/absence of a host.
- Marked large nymphs (3rd–5th instar), adult females, and adult males continued to be recovered up to 57, 113, and 134 days after host absence.

Males have insatiable sexual appetites.

- Violent breeding kills females. Traumatic insemination.
This adversely affects lab research (just males, females die).
- Females wander off to survive thus spread the infestation.
- Male + female nymphs emit an alert defense pheromone to ward of adult males.

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BED BUG BITES

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- Bites are small reddish hard & swollen welts that can itch severely.
- Bite locations with moderate-severe infestations are often clustered together or in the "breakfast-lunch-dinner" line pattern.
- The reaction is dependent on the person.
 - Approx. 30-60% of the public does not react at all to bites.
 - Infants-toddlers & the elderly react even less.
- Bites are not in real time. Reaction often occurs between 2-9 days after the bite.
- Exposed skin are the ideal feeding areas, typically arms, legs, neck, & waist.
- Bites can become infected from intense itching or dirty finger nails.
- Suck blood exactly the same way mosquitoes do (proboscis, stylets, imbibe)
- 2015 study linking lectularius to chagas disease. NIH refuted in 2017.

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MORE ABOUT BED BUG BITE

Carpet Beetle Larva

- Reactions can be from pests or a number of other sources, many are non-pest.
- Carpet beetle larva have created bite-like reactions that people have mistaken for bedbug bites.
 - Carpet beetles are quite common in most structures.
 - The larval stage hairs are invisible & cause a reaction when in contact w/skin.
 - Carpet beetles do not bite & increased sanitation is the best control.
- You **CAN NOT** identify a pest based upon a bite or skin reaction.
 - A doctor-dermatologist can **ONLY** state the reaction is from an arthropod **ONLY IF** a biopsy of the affected area is performed.
 - They **CAN'T** say it is a bedbug, flea, etc. bite.
- In some cases the body can cause psychosomatic reactions based upon stress & past reactions from the situation.

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#1 = The general public's lack of knowledge about bedbugs.

Waiting and/or self-treating.

#2 = Tech treatment issues. Lazy? Poorly trained? Cookie cutter?

#3 = Sharing their pest with family, friends, & strangers... re-introduction.

#4 = Inadequate treatment, preparation, cooperation, education, etc.

Basically, just a poor service offering/program.

#5 = Lack of cooperation by management/tenants. Not taking bedbugs & the situation seriously. Price or value? Rushing into it? Cutting corners?

1) Early detection 2) Inspection and/or treatment of surrounding units

3) Removal of clutter 4) Good tech + treatment + overall program

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- Non-Repellent formulations: Proven success but ROTATE!
- Aphend & Sterifab = Results + fits a lower impact offering.
- Pyrethroids: Faster results but resistance & repellency risks.
- IGRs: Science has proven **NO**!
- HEPA Vacuum: Awesome tool. May not get all eggs.
- Thermal: Proven treatment but.... Convection is critical, once thermal death point is hit, shock harborages item movement. No residual though.
- Monitors: History has not been great. Promise on horizon?
- Cryogenics or Steaming: More labor intensive + works but limited deep penetration harborages. No residual. Mildew/mold after-effects on soft fabric surfaces has occurred.
- Fumigation: Works but logistical/regulatory challenges. Costly. No residual.
- Proactive treatments: Hotels, condos, etc. with long-term residual products. *Next slide

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1. Frequent inspections, 2-4X per year depending infestation history + treatment as needed.
2. Frequent inspections + treatment, even if no bed bugs are detected during inspection.

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WHAT IS THE CAUSE OF MOST STRUCTURAL DAMAGE?

Termites

(\$5-6B Annually?)

Wood Decay Fungus

(\$10B Annually)

Wood Boring Beetles

"Many wood destroying insects are dependent upon, or have taken advantage of, various types of structural timbers because of the symbiotic relationships with bacteria, fungi, and protozoa. Fungi adds a physical and nutritional component to wood thus making it attractive to these organisms."

Graham (1967) | 2002 Entomology UC Riverside

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THE BEETLE VARIABLE

$$y = x_1 + x_2 + x_3$$

y = Infestation, damage, and species.

x₁ = The type of wood (hardwood or softwood).

x₂ = Condition of wood, how old is the wood, **has it been protected?**

x₃ = Environmental conditions at the infestation site.

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WOOD SPECIES: VITAL 1ST STEP



Red Oak

HARDWOOD

- Hardwood comes from a deciduous tree which loses its leaves annually.
- Hardwood tends to be slower growing and therefore denser, superior strength, and durability.
- Oak, Maple, Hickory, Ash, Teak.



Red Pine

SOFTWOOD

- Softwood comes from a conifer which usually remains evergreen.
- Softwood is faster growing, lighter and less dense wood, more flexible.
- Pine, Fir, Cedar, Spruce

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IN THE BEETLE ZONE

**Know the Wood:** Hardwood (oak/maple/hickory/ash) & Softwood (pine/fir/cedar/spruce)

**Structure Age:** Infestations seldom obvious in structures less than 10 yrs old, more so in 10+

**Moisture Levels:** Most species prefer 13-30% moisture content but 10% is the worry mark

**High humidity:** Essential for egg hatch

65-90% humidity = More than 80% hatch
30% and below = Hatch reduced to zero

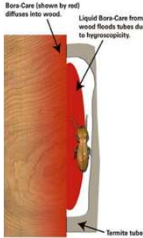


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DIFFERENCES BETWEEN TIM-BOR & BORA-CARE

- Bora-Care provides a 23% loading when applied.
- Tim-bor provides a 15% loading.
- Bora-Care is hydrosopic and will reliquefy when termites build mud tubes, killing the termites and the tube is abandoned.
- Tim-bor does not have this effect, and termites can tube over Tim-bor to reach untreated wood







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INSPECTION TOOLS

- Moisture Meter
- Bright Flashlight. Rechargeable is best
- Probing Tool, long & heavy duty
- Stethoscope if you take it to the next level for inspections
- Smartphone for images & notes
- Magnifying Tool or Loop Lens
- PPE (bump cap... your skull will thank you!)
- Ladder or step stool



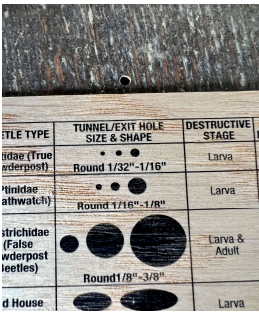


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WANT SOME WOOD BEETLE CARDS? CUSTOMERSUPPORT@NISUSCORP.COM





BEETLE TYPE	TUNNEL/EXIT HOLE SIZE & SHAPE	DESTRUCTIVE STAGE
Cerambycidae (True woodborers)	Round 1/32"-1/16"	Larva
Synanthrenidae (Small wood-boring beetles)	Round 1/16"-1/8"	Larva
Curculionidae (False woodborers)	Round 1/8"-3/8"	Larva & Adult
Longhorn	Round 1/8"-3/8"	Larva

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THE CARPENTER BEE



- 5 species in the US, solitary insect
- Females lay 6-10 eggs before death, complete life cycle is 3 months
- Males die after mating
- Broods emerge from galleries in August-September and tend to hover around home
- They do over-winter and often re-infest birthplace
- Robust 1" bee often mistaken for bumblebees
 - Hairless abdomen and hairless spot on the center of prothorax
- Northeast species, males will have yellow-white face whereas females will be pure black
- Daunting presence in spring due to mating and nest construction
- Depending on our winter-spring season is usually in full swing by mid-May and has run its course by July
- Males are harmless but watch out for the females!



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PMP TREATMENTS FOR CARPENTER BEES

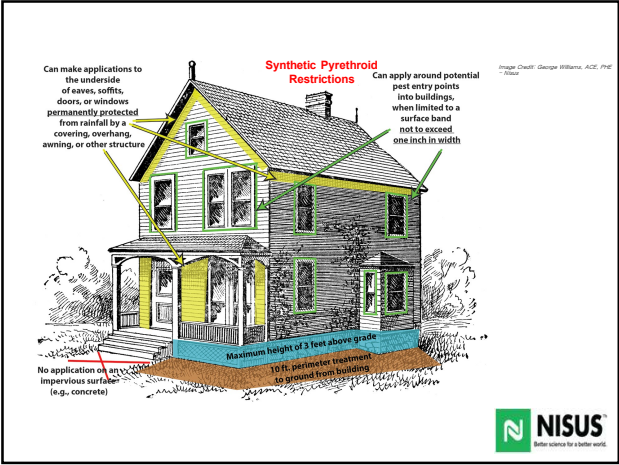


- Pyrethroids work best as they kill faster plus repel bees
- Dusting galleries is important but be very careful of drift as dust formulations are very lethal to pollinators
- Height issues = treatment accuracy, dexterity, spillage, etc.
- Dustick, Bee Pole, Exacticide, or Gotcha saves you from ladders but be careful with power line arcing (can happen 10FT away!)
- Preventative surface treatment is limited due to the pyrethroid restrictions, the old days are over! Certain non-repellents are more forgiving, but bees will interact w/treated area



Endless uses, 1 Gotcha Sprayer Pro

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CARPENTER ANT FACTS

- Carpenter ants often build a large parent or brood nest and then add as many as 20 satellite nests. Average is 3-5 per house.
- The main nest requires 15-20% moisture/humidity, so it will either be outside or, if indoors, near a leak or a poorly drained area. Typically, the parent nest is in decaying or rotten wood.
- 90% of the time the parent nest is located in a tree or stump or other outdoor areas. 10% of indoor nests will be satellites and close to a moisture issue. The ants maintain trails for travelling between the satellite nests and the main nest.
- Carpenter ant colonies grow slowly in the first 2yrs. Within 3-4yrs the colonies begin to grow rapidly adding several hundred workers per colony. In 4-5yrs the colony begins to swarm further accelerating colony size.
- Each colony can have 500-2,000 workers and by the 4th year several hundred swarmers.

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Thank You!

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