

An Overview of Different Options to Treat for Bed Bugs



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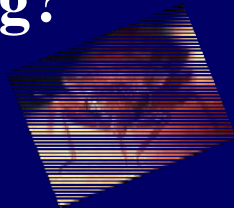
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Bed Bugs Are Back!

- All 50 states are reporting problems
- Degree of problems are regional and difficult to predict
- Issues by country are also unpredictable – some Caribbean Islands have issues but not others
 - Japan does not have a huge issue – monoculture
 - UAE/Dubai some issues in oil fields – migrant workers
 - Europe – depends on the country



So What is Working?





Research is Providing Some Insight Into Pesticide Efficacy

Efficacy?
Repellency?
Resistance?



Pesticide Resistance – How Big of a Problem Is It?



David Moore & Dini Miller: Virginia Tech - Residual Effectiveness

Forced Exposure



Treatment	N	LT ₅₀ Lab Strain	LT ₅₀ Field Strain
Demand CS .03%	50	20 min	1h 18min
Tempo SC Ultra .05%	50	44 min	12h 10min
Talstar One .02%	50	53 min	3d 16h
Suspend SC .06%	50	61 min	19d 2h

University of Kentucky

96 of 110 field populations (88%) tested were moderately to highly resistant to pyrethroids



Stephen Doeggen

Several hundred to several thousand fold resistance to Deltamethrin & Lambdacyhalothrin!

Univ. Kentucky
Potter, Romero, & Haynes 2007

Current pesticides are effective as direct contact sprays but the effectiveness of dry residues is questionable!

Pest Control Technology July 2007

**The most important point
with pesticides is.....**

**ROTATION,
ROTATION,
ROTATION!!!**

**Are
Pyrethroids
Repellent?**

Repellency of Pyrethroids

Bugs avoided clean surfaces treated with pyrethroids but were not repelled when treated surfaces were marked with feces and eggs.

Romero et. al. J. Med. Entomol. 46(1): 51-57 (2009)

**Feces & Eggs, More Attractive than Pyrethroids are Repellant
Argues for Crack & Crevice applications
directly into harborages!**

Wang et al. – Rutgers University



DEET – the higher the percentage of DEET the more repellent it is

All-Natural Sprays

- Eco-Raider and Bed Bug Patrol demonstrated high mortality after 10 days after direct contact
- Others tested never reached above 50% mortality
- Temprid killed much quicker
- Staining can be an issue (Eco-Raider)

Singh et al., PCT, March 2013

Aprehend
Ready to use

Aprehend
Ready to use

A new Biopesticide
for the control & prevention of bed bugs

ConidioTec
Advanced Green Pest Control
www.condiotec.com



What is the Future?

- Initial results look promising for Aprehend being an effective product in the toolbox
- Need data on “normal” infestations
- Can you treat low-level infestations in a basic fashion and get results?
- Is there a proactive model (price may be restrictive)?

Dust Options

- Low-impact
 - Cimexa
 - Diatomaceous Earth
 - Alpine
 - Many others...how are you applying them?

Power Dusters



**It's not what you're
using...it's how you're
using it!!!**

Non-chemical Measures

- Vacuums
- Steam
- Encasements
- Interception Devices

Vacuums can be used to quickly eliminate large numbers of bugs



Steam is a Very Effective Tool



Destroys all stages including Eggs!

Penetrates Well into Pleats and Folds



Remember that contact kills are typically used as spot treatments... not entire apartment treatments!!!

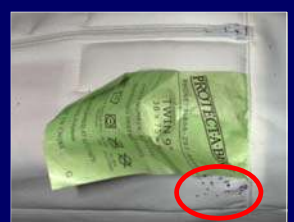
Steaming takes typically 5-10 minutes per apartment on an Initial service

Encasement of Mattresses & Box Springs



Pro-Active Use

- Prevent Infestation
- Early Detection





**Reactive Use:
Protect Replacement Bedding**

Encasements are no longer effective if they become ripped, torn or worn

Installing felt on the bed frame resolves this issue




Interception Devices

Pit Fall Trap – Intercepts bugs away from sleeping and/or resting areas as they seek a blood meal

Field Results: Interception Devices

Total # of Apartments	# of Bugs Visually Observed			
116 units	746	[Red Circle]	[Red Circle]	[Red Circle]

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On to the job....



Traditional Preparations

Traditional Preparations

- Strip beds
- Empty dressers
- Empty
- Laundry
- Stand bed up
- Empty all furniture
- Pull furniture away from wall
- ETC.....

WHY?!?!?

Progressive Preparations

- Clean your room
 - so that we can move in it
- Leave the bed as is
 - Don't distribute bugs around
- If we need you to launder items or empty items out, we will let you know for the next service

In a study of 114 bed bug infested apartments, Rutgers University solved 95% with no involvement by the tenants

Wang et al, PCT 2014 and Cooper et al, Pest Mangmt Sci 2015

Schedule of Services

- Initial service ~ 2 hrs., 2 techs for 2 bedroom apartment
- 1st follow-up 10 days after initial ~ 1 hr., 2 techs for a 2 bedroom apartment
- All other follow-ups are 2 weeks apart
- Do not believe in a “set” number of follow-ups, should keep servicing until the bugs are gone

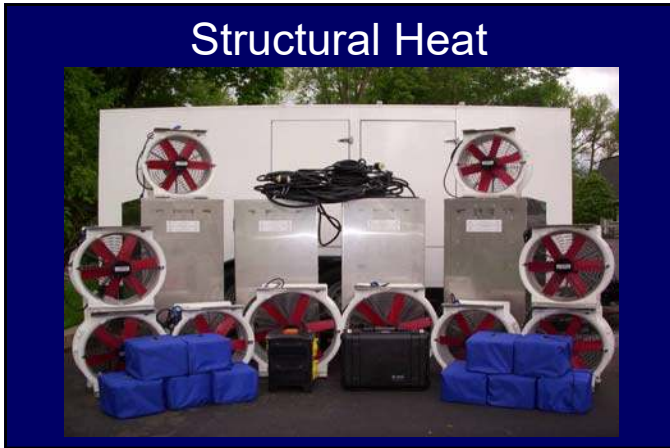
Declaration of Control/Elimination

- Tenant/client has not seen any bugs or received any bites since our last service
- If technician does not find any bugs, control is declared
- In six weeks a survey is sent to tenant/client, if still no bugs or bites, elimination is declared
- If work was guaranteed, 90-day service plan takes effect

100% elimination of bed bugs in a single visit is unlikely!

- Eggs or bugs that were missed or were inaccessible
- Bugs that were between blood meals will become active in the days following treatment
- If pesticide tolerance or resistance is present in the population residual treatments may not be effective

**A Follow-up Program is Critical if
100% Elimination is your Goal!**



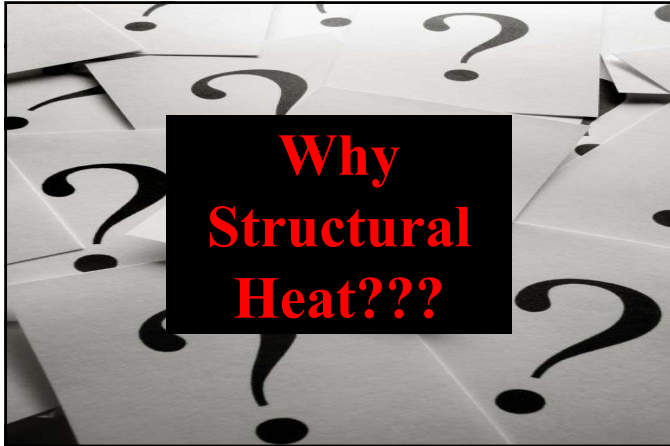
History

- 2008-2010 performed heat treatments and evaluated the technology
- Many claims being made about “one and done” treatments
- Which markets make the most sense

Steve Kells & Temp-Air (2009)

Temperature	Mortality in Time (Minutes)	
	Adults	Eggs
113 °F	90 min vs. (15 min)	480 min vs. (60 min)
118 °F	2 min	90 min
122 °F	< 1 min	< 1 min

Want temperatures over 120 °F



Use of Heat With Bed Bugs

- Can do things with heat we can't do with traditional treatments
- Eliminate infestations in one service
- Crash populations
- Considered a "greener" option (reduce amount of chemical)



Low - Moderate Level Infestations

Elimination of 95% or better in one service (may be closer to 98%)

High Level Infestations/Clutter

Elimination in one service can be difficult but can drastically crash populations (from 10,000 bugs to 10 bugs in one treatment)

This is Labor Intensive!

- Size and weight of the equipment
- Constantly manipulating the environment
- All while working in 120°F+ temperatures



The Changing Market

- Many pest control companies re-evaluating heat equipment
- As the market changes it may reduce providers
- Number of providers will change by state – heat treatment is very popular in CA and mid-Atlantic region

Fumigation



www.sanjoaquinpestcontrol.com

Fumigation



www.purplebugpestcontrol.com

Fumigation

- Structural fumigation is a “niche” in the Northeast
- Very time consuming and often too expensive for most clients
- Commodity fumigation is a more feasible option but space can be an issue

Now What?

- Many different ways to kill bed bugs
- What is best for your property?
- Which option is best for your budget and frequency of bed bugs?
- There is no right answer!

Questions?