

# Thermal Control of Cockroaches, Snails, and Commodity/Lumber Pests

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Preventive Medicine



# Facility Preparation

- Shut off all equipment
- Remove
  - Perishables, Spices, Bread, Fruit
  - Compressed gas cylinders
  - Flamables
  - Computers, TVs
- Applied Gentrol, insect growth regulator



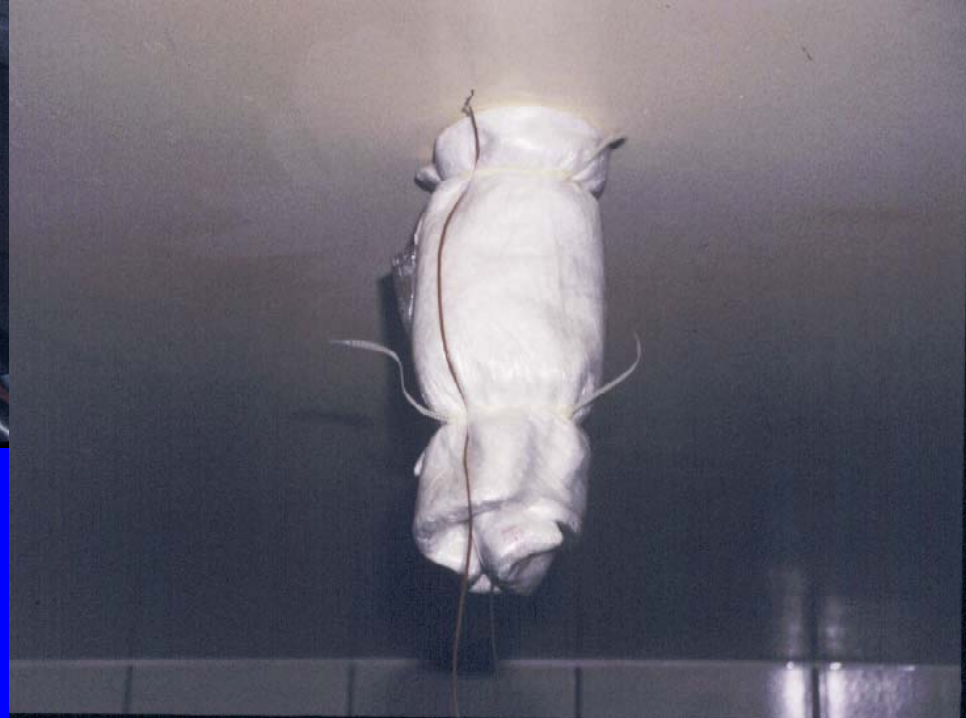
Clear the floor

Prevent

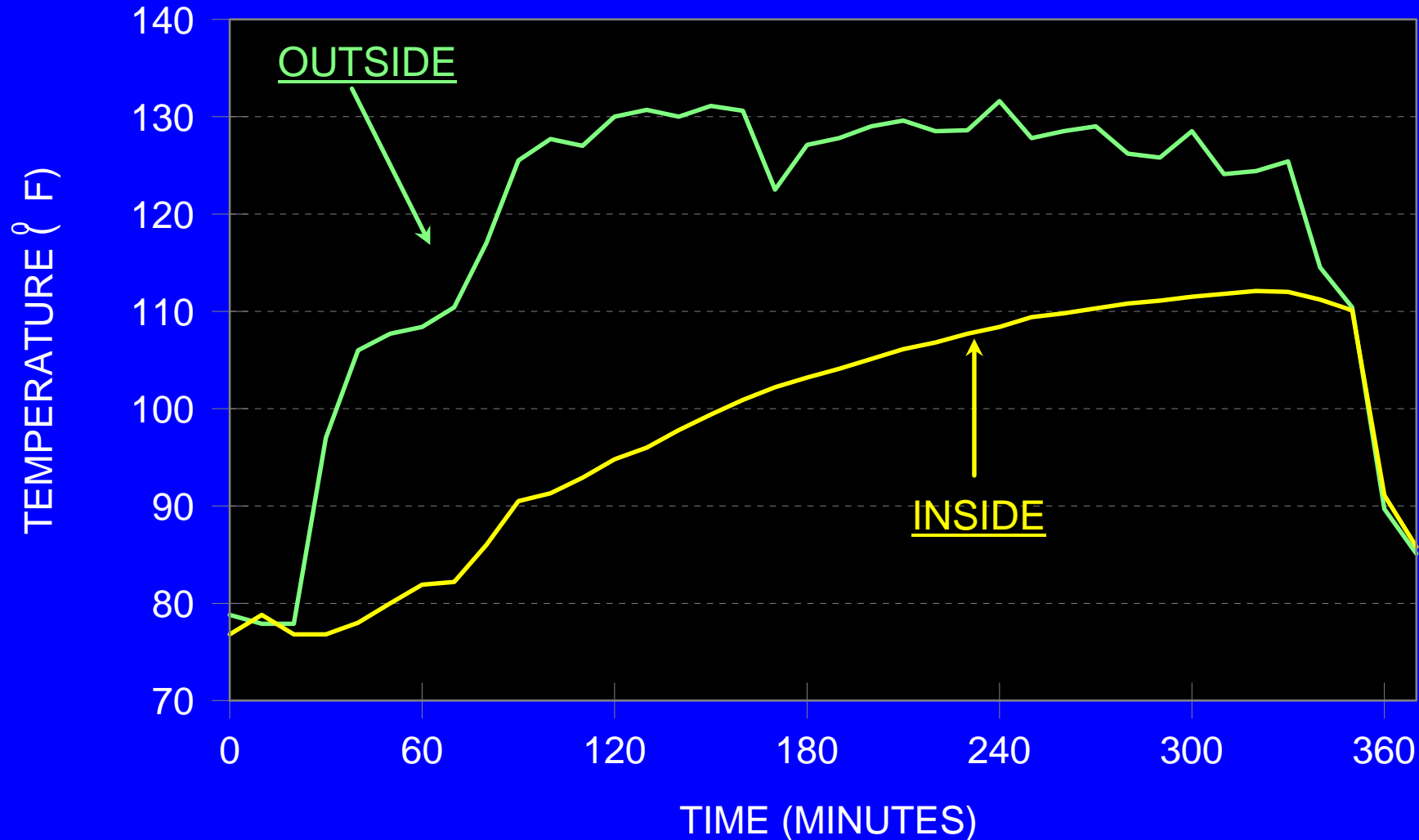


Escapes

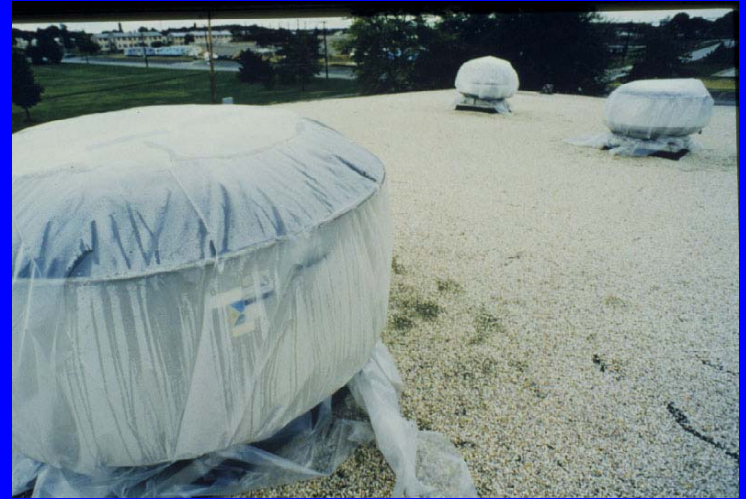
# Prevent Damage



# SPRINKLER HEAD: TEMPERATURES INSIDE AND OUTSIDE OF INSULATOR



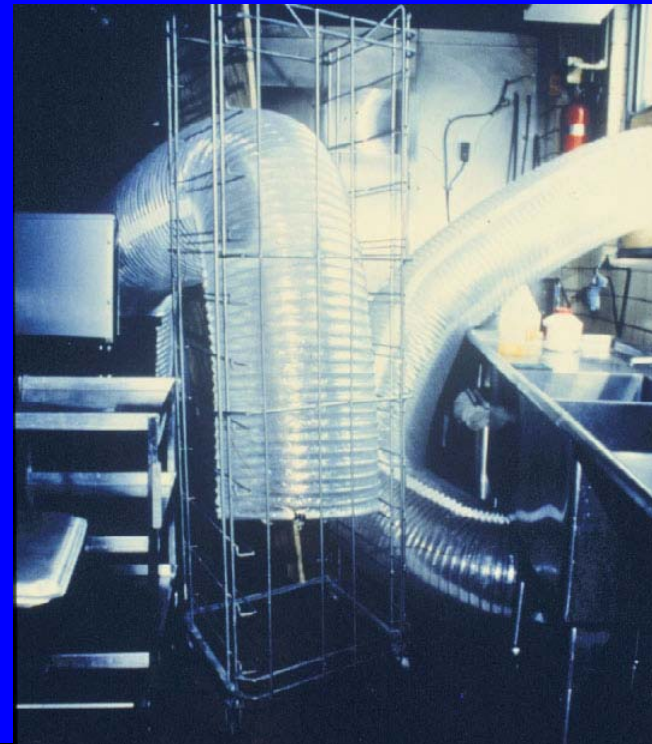
Corral



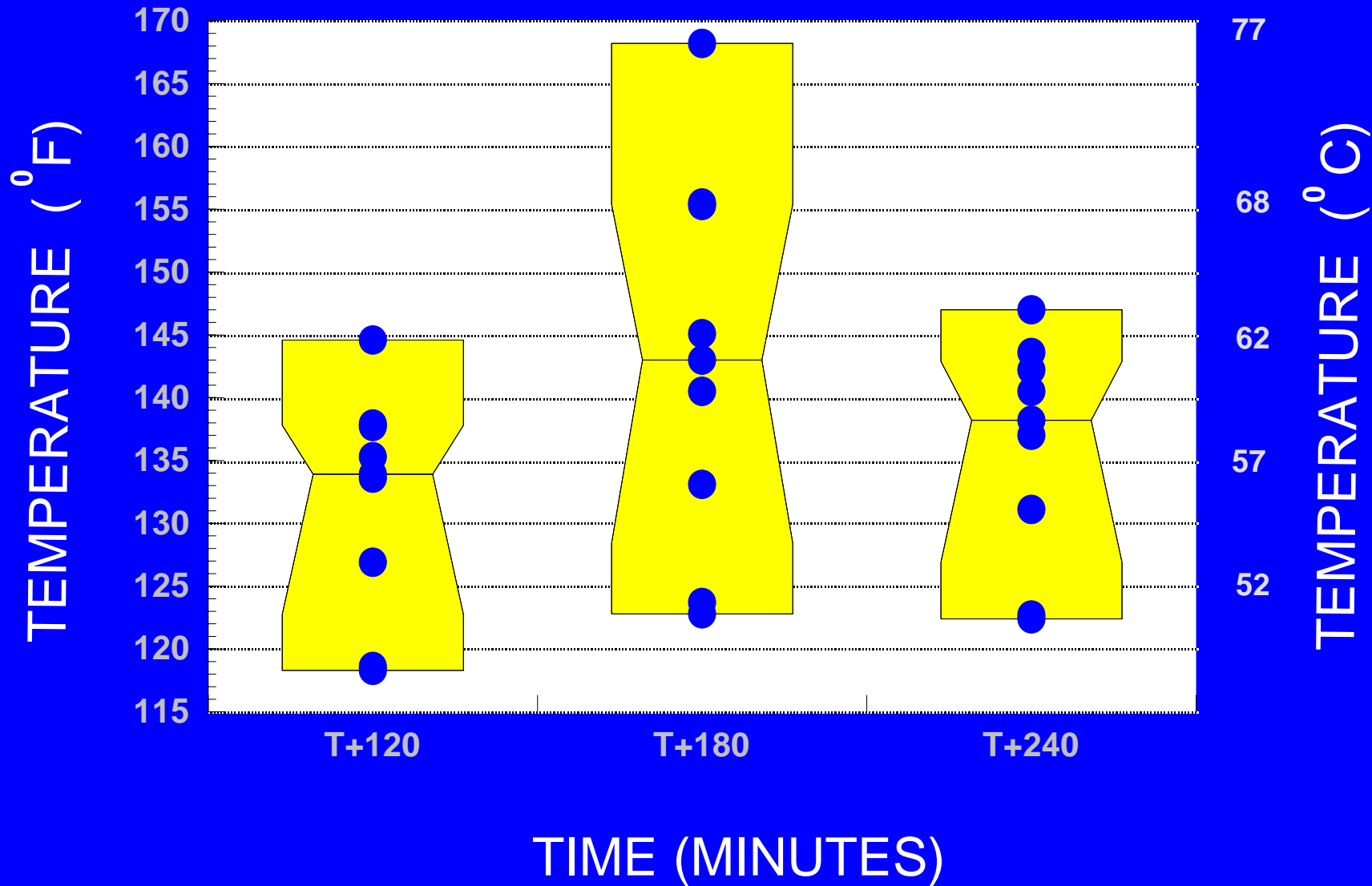
Heat



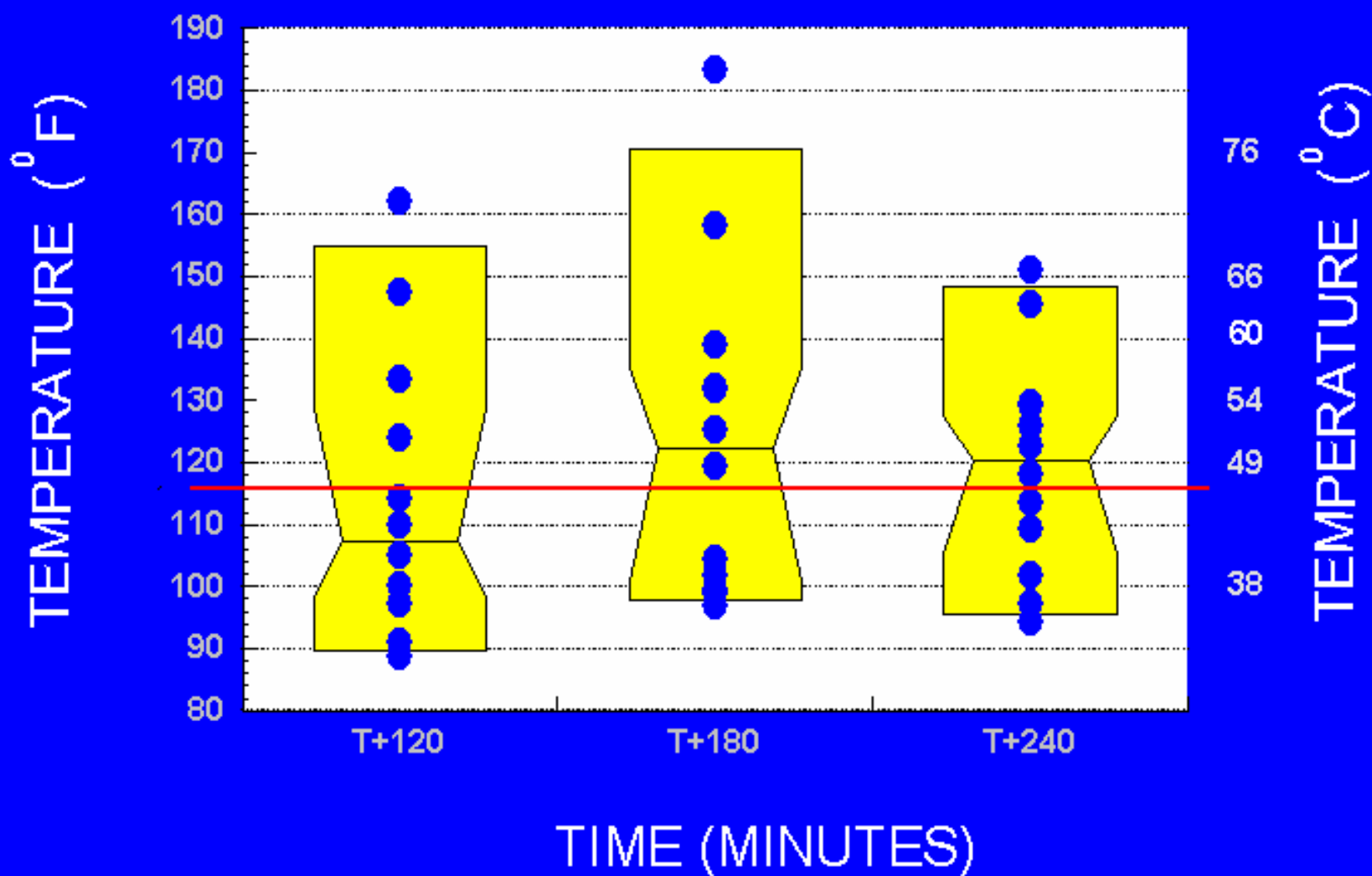
# Setup Heaters



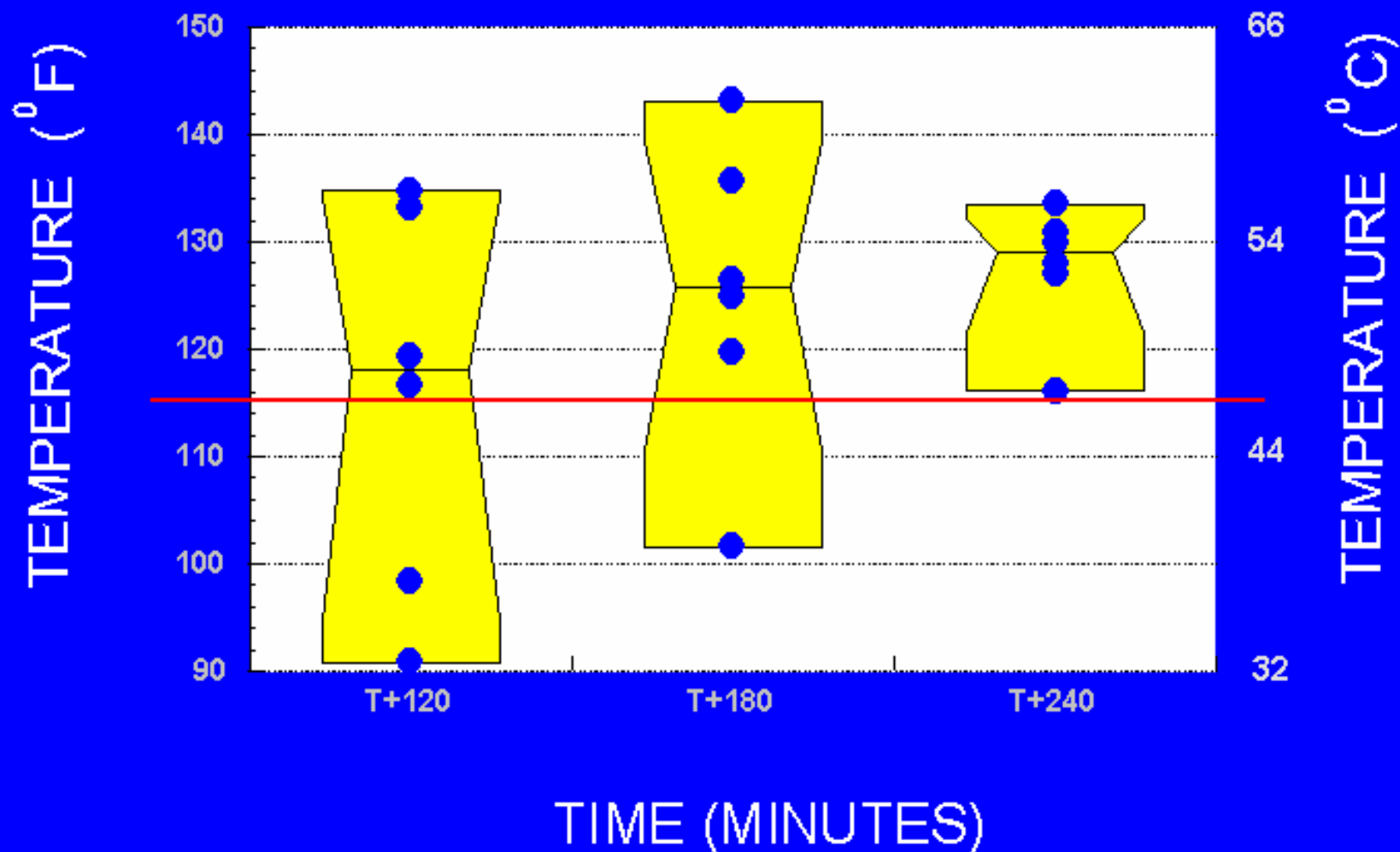
# VARIATION OF CEILING TEMPERATURES



# VARIATION OF FLOOR TEMPERATURES



# VARIATION OF HARBORAGE TEMPERATURES



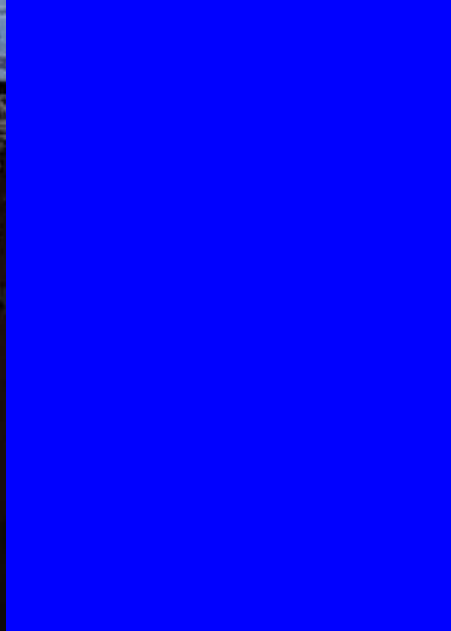
# Prevent



## 4 –6 Hours Dead Cockroaches



# Vacuum the Living

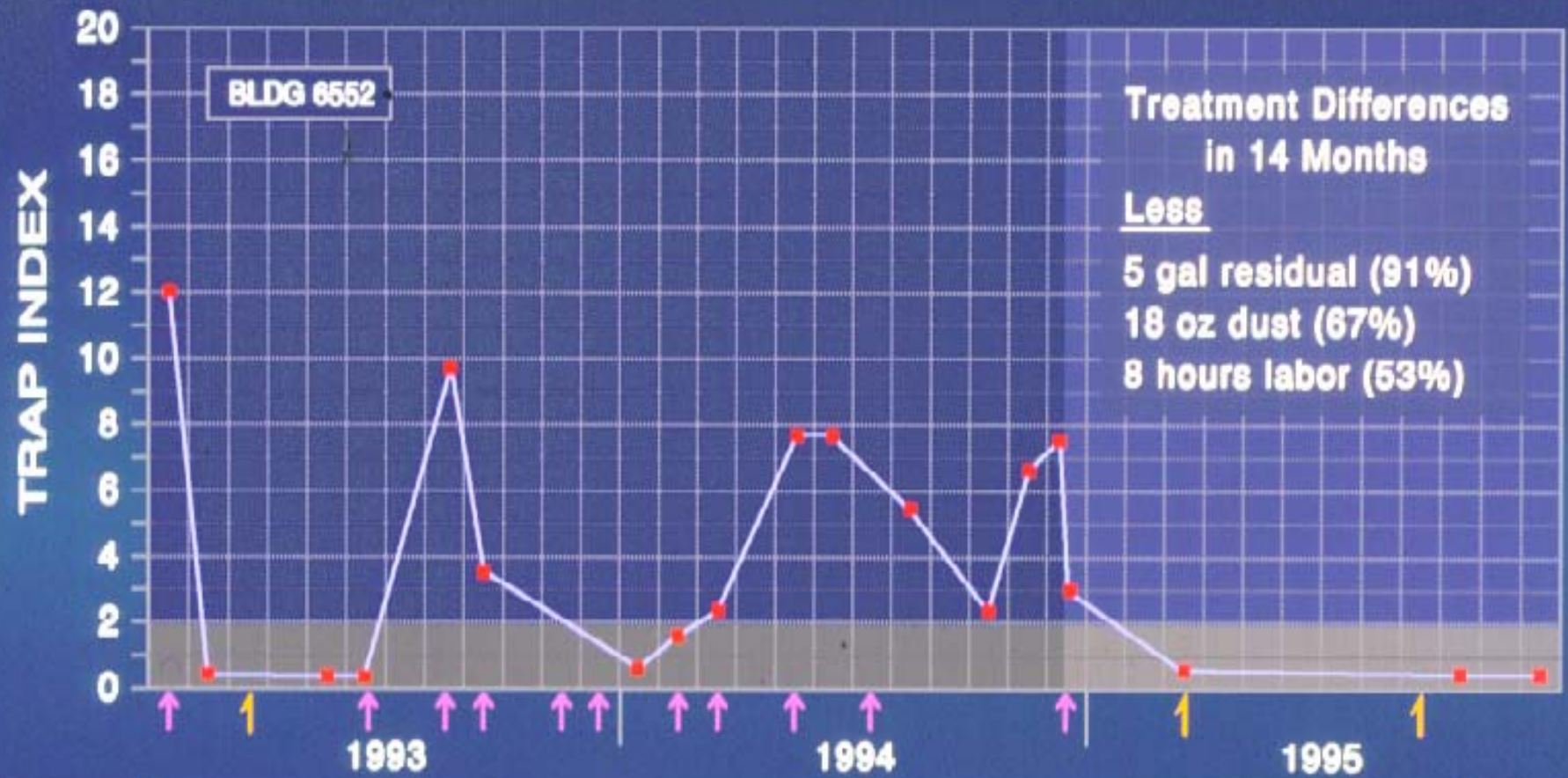


# THERMAL CONTROL TRAP INDEX BEFORE AND AFTER



	BEFORE THERMAL CONTROL		AFTER THERMAL CONTROL
	PESTICIDE TREATMENTS		ONLY DUST & BAIT STATIONS
	TRAP INDEX (NUMBER OF COCKROACHES PER STICKY TRAP PER NIGHT)		
	TRAP INDEX OF 2.0 IS THRESHOLD FOR COMPLETE PESTICIDE APPLICATION		

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  AFTER THERMAL CONTROL

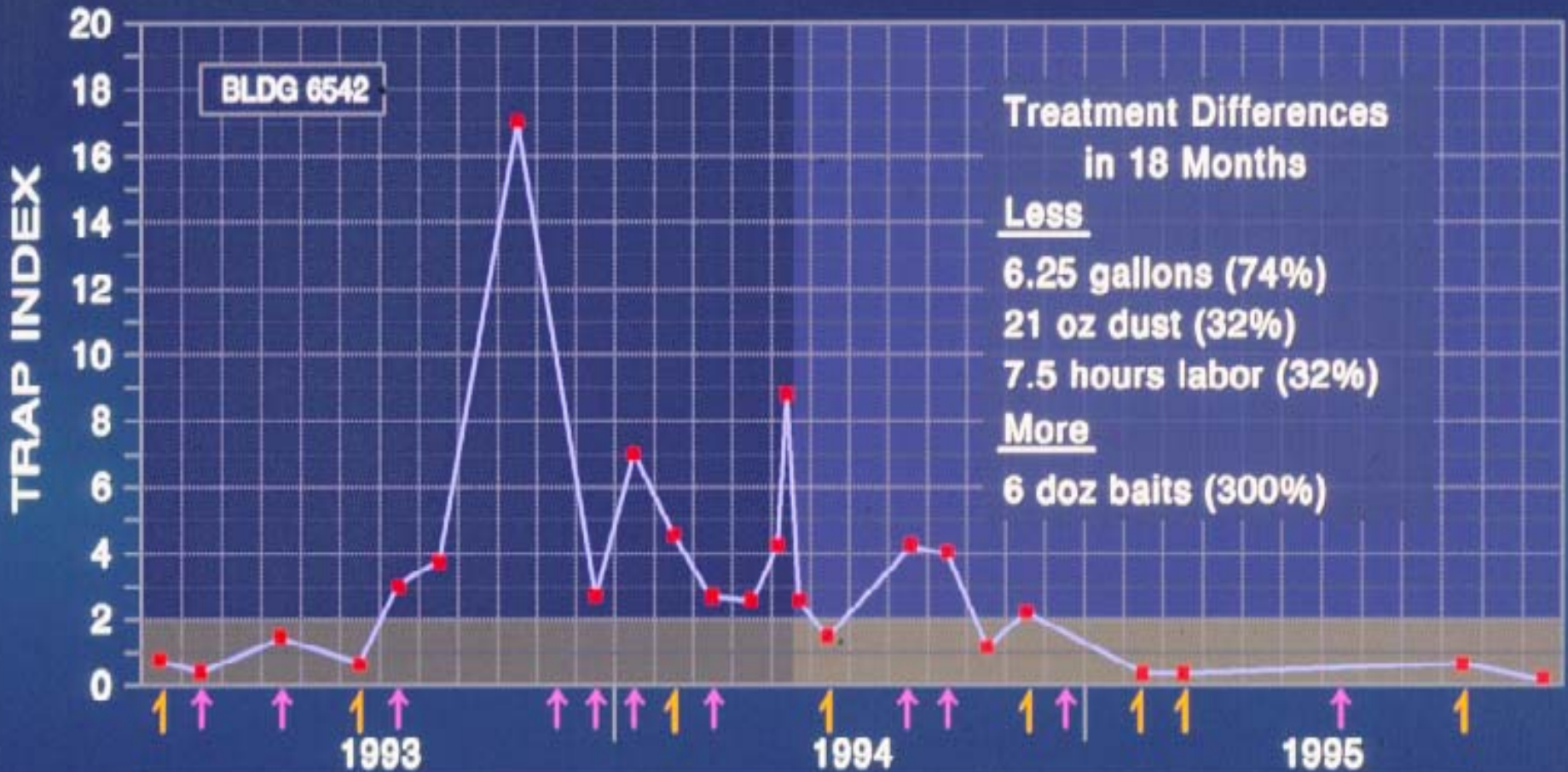
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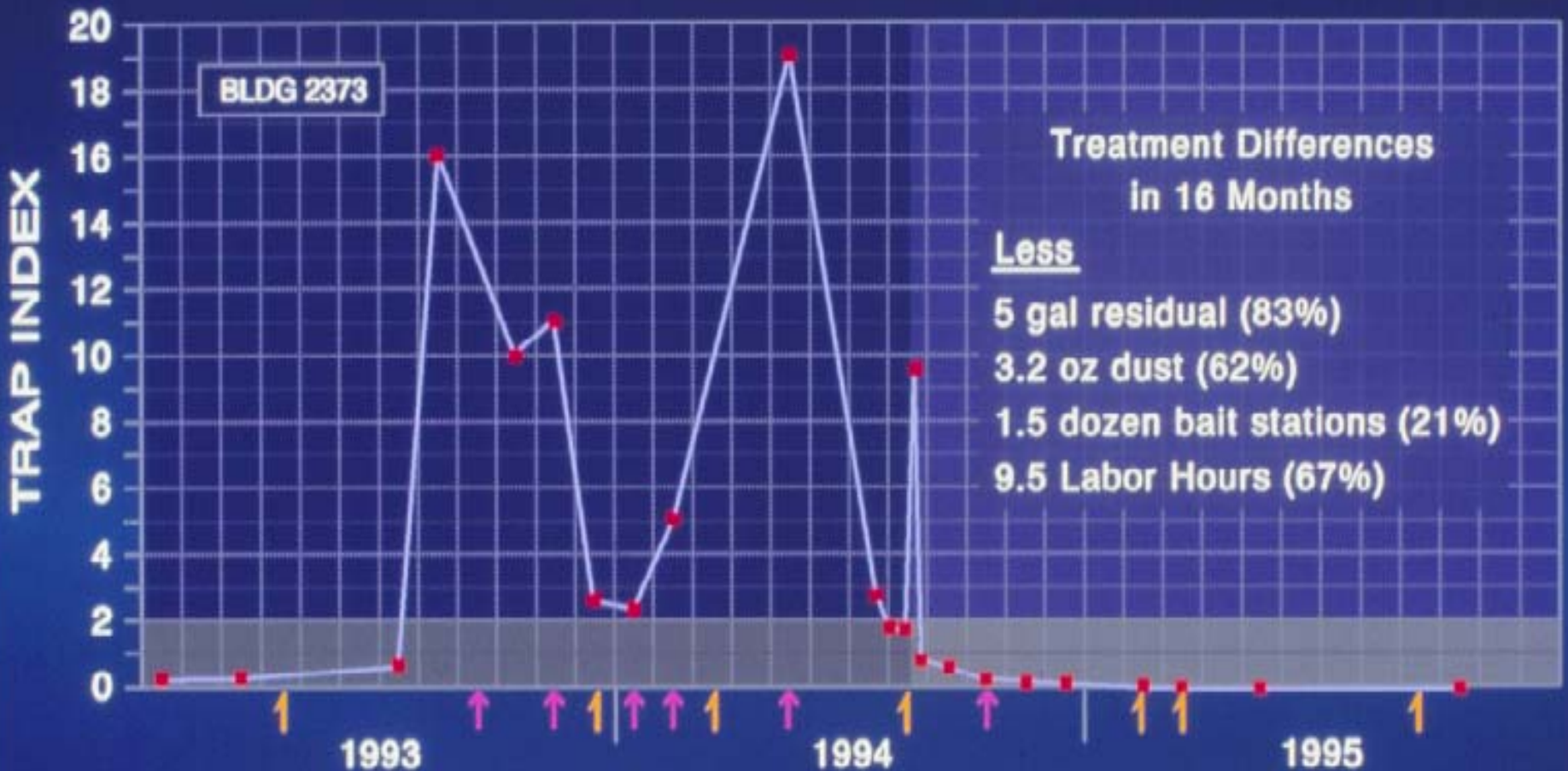
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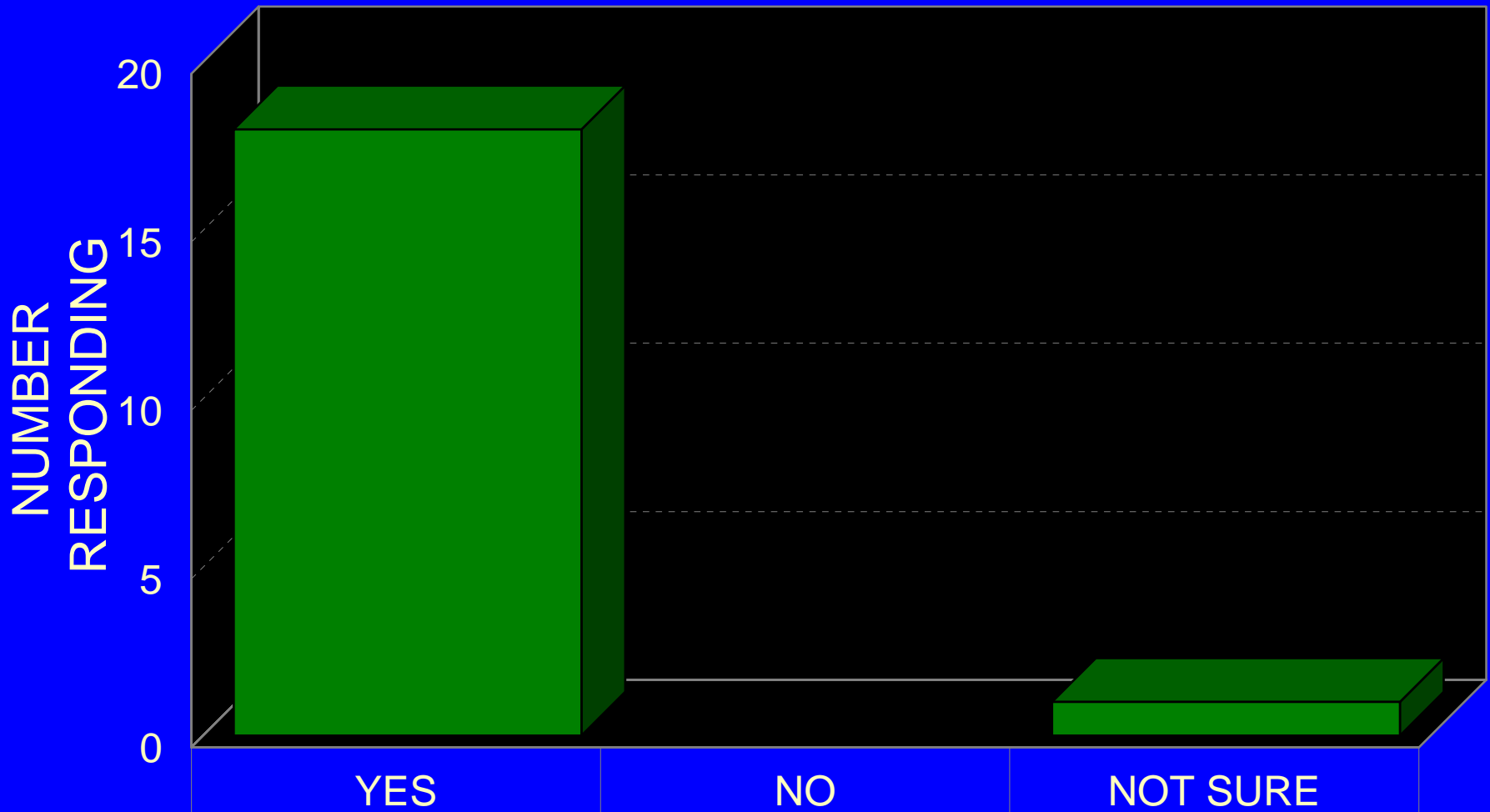
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# SHOULD METHOD BE OFFERED TO OTHER FACILITIES



## Process Detailed

<http://chppm-www.apgea.army.mil/ento/TG208/TOC.HTM>

# Why So Effective

- Heat penetrates all equipment harborage
- Gentrol® is an excellent complement
- Perhaps?
  - Population reduced below growth threshold
  - Interferes with chemical communication

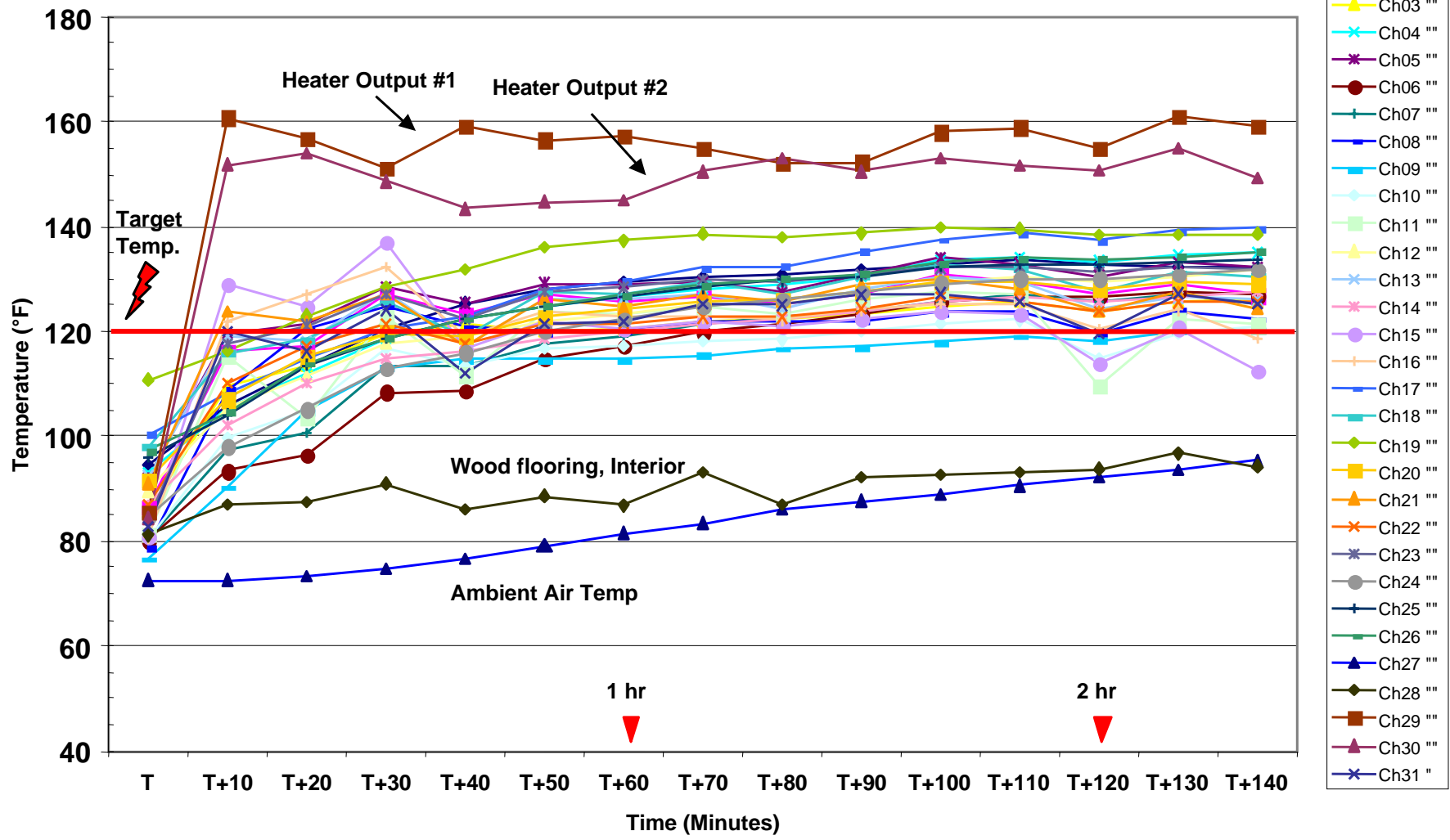
A photograph showing a large pile of snail shells, likely from a container. The shells are mostly brown and tan with spiral patterns. An arrow points from the text above to a specific shell in the pile.

Exotic Turkish land snail  
(*Monaca syriaca*)

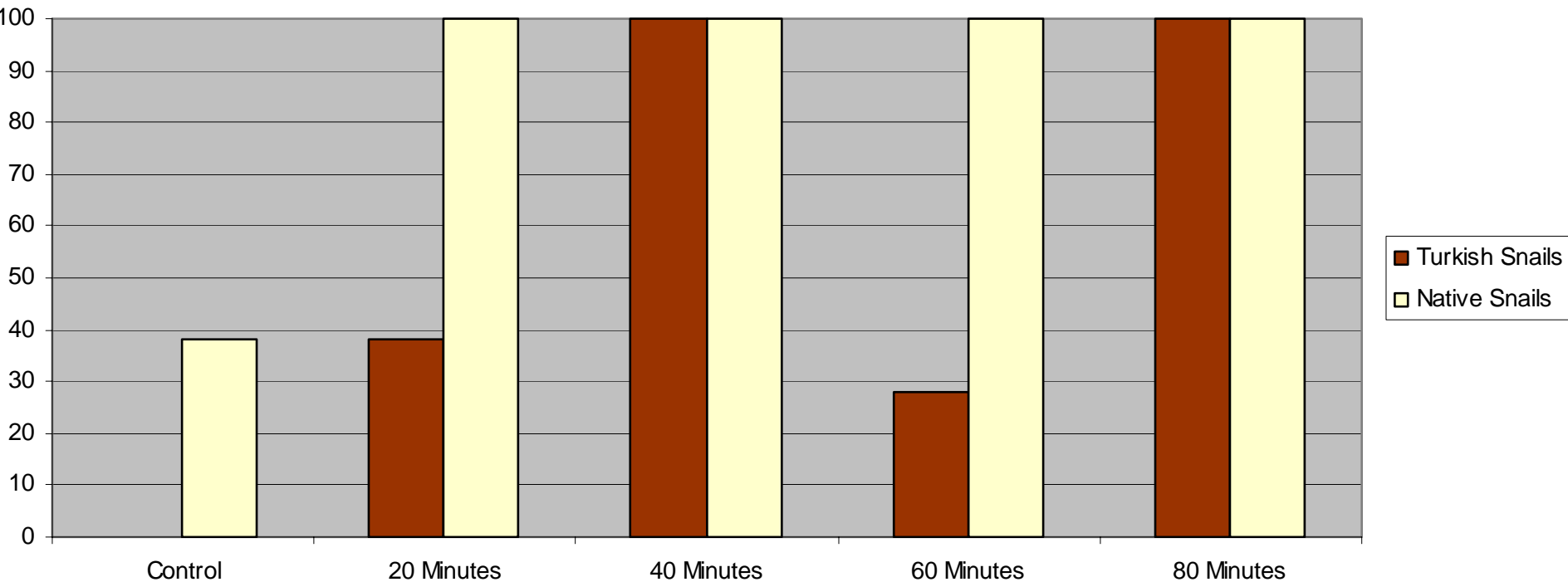
Native land snail  
(*Succinea camestris*)



# Treatment Trial No. 1: Temperature Profile for Snail Control Project, 20 Ft. Metal Military Shipping Container, Sunny Pt., NC, 11 May 2000.



# Mortality of Snails exposed to average air temperature of 129 deg. F





# Snail Trial Conclusions

- Laboratory studies of thermal death point needed
- We can heat the exterior of containers in a windproof enclosure
  - Quickly 2 – 3 hours
  - Without damaging contents inside
  - Inexpensively, \$25 energy cost
- Future trials with USDA planned

# Thermal Chamber

- Collaborative effort with Topp Portable Air and Defense Logistics Agency
- Goal: Find an alternative to fumigation for commodity pest



# Eight Pallets of 20-lb Poly Pack Boxes of Macaroni – 4 Tons





**SAFE-HEAT**  
Thermal Pest  
Eradication System  
1-800-892-8677

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Patent Pending

PLACE

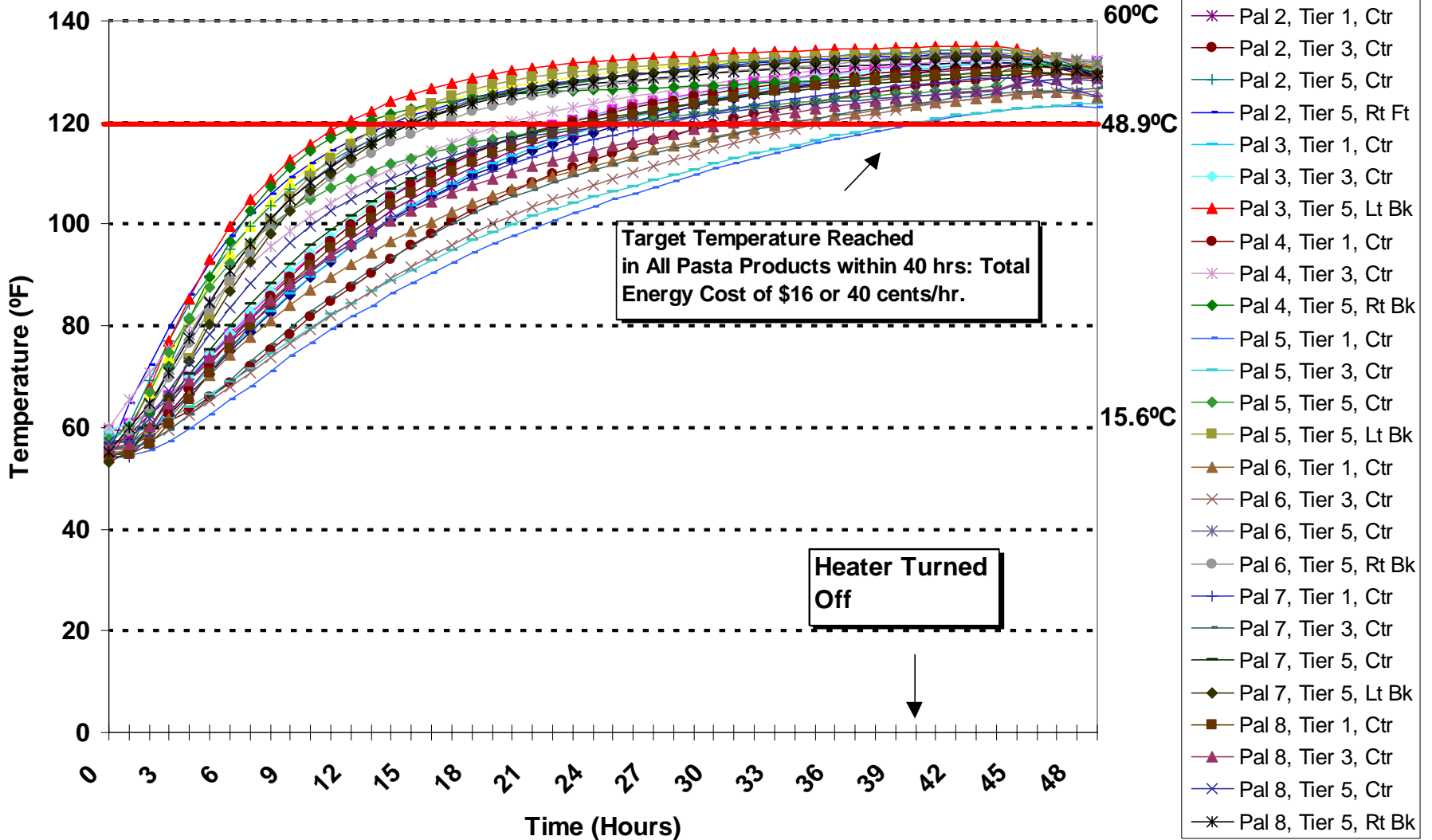


**Cremette**  
ELBOW MACARONI  
Enriched

DANNA  
3-2  
DANNA



**Figure 8. Temperature Profile within 4 Tons of Palletized Macaroni, Chamber Air Temperature 140°F (60°C)**









# 2<sup>nd</sup> Generation Thermal Chamber Results

- All product meet target temperature without exceeding the upper limit
- All insects dead
- No degradation of taste, color, or cooking characteristics
- Simple inexpensive operation



# Pine Wilt Disease

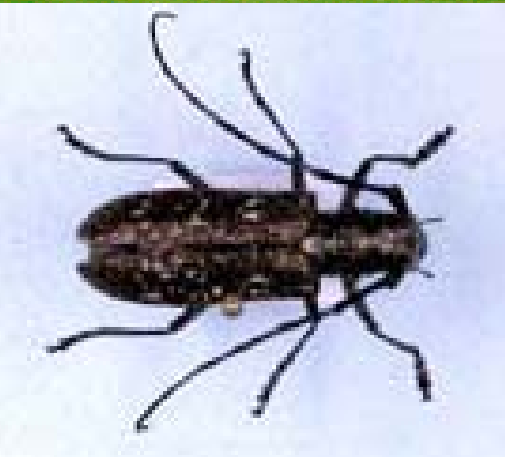
**Pine Wood Nematode (*Bursaphelenchus xylophilus*)** (pine chips, unseasoned lumber, packing-case wood)

**Insect Vectors: Bark Beetles and Sawyer Beetles**  
(pallets, crates, dunnage)

**USA Distribution: 36 States**

**International Distribution: Canada, Mexico, Japan, China, S. Korea**

**Effective October 2001, wood packing entering European Union must be heat treated to 56° C for 30 minutes**



**Whitespotted sawyer**

A black and yellow forklift is shown in the process of moving a large pallet of wooden crates. The pallet is loaded with numerous wooden crates, each containing smaller wooden components. The pallet is being pushed into the open rear door of a large, industrial-grade thermal pest management chamber. The chamber is made of metal and has a heavy door with a locking mechanism. The scene is set in a warehouse or industrial facility.

**PEST-HEAT® Thermal  
Pest Management Chamber**

**Patent Pending**

# 3<sup>rd</sup> Generation Thermal Chamber

- All seasoned wood pallets meet target temperature **within 4 hours**
  - 3 run per day capacity
- **Approved by USDA-APHIS** for the “56/30” treatment process
- Does **not affect pallet** service life
- Energy cost **5 cents per pallet**
- Additional information: <http://pestheat.com>

# THERMAL PEST CONTROL

- Clearly it has a place
- Move a lot of controlled hot air quickly
- Recognize it's limitations