BUGGIN' OUT:

Addressing and Eliminating Pest Infestations in Museum Collections

RLA Conservation

Sarah Giffin, Assistant Conservator

Regina Jestro, Technician

Rosa Lowinger, Chief Conservator

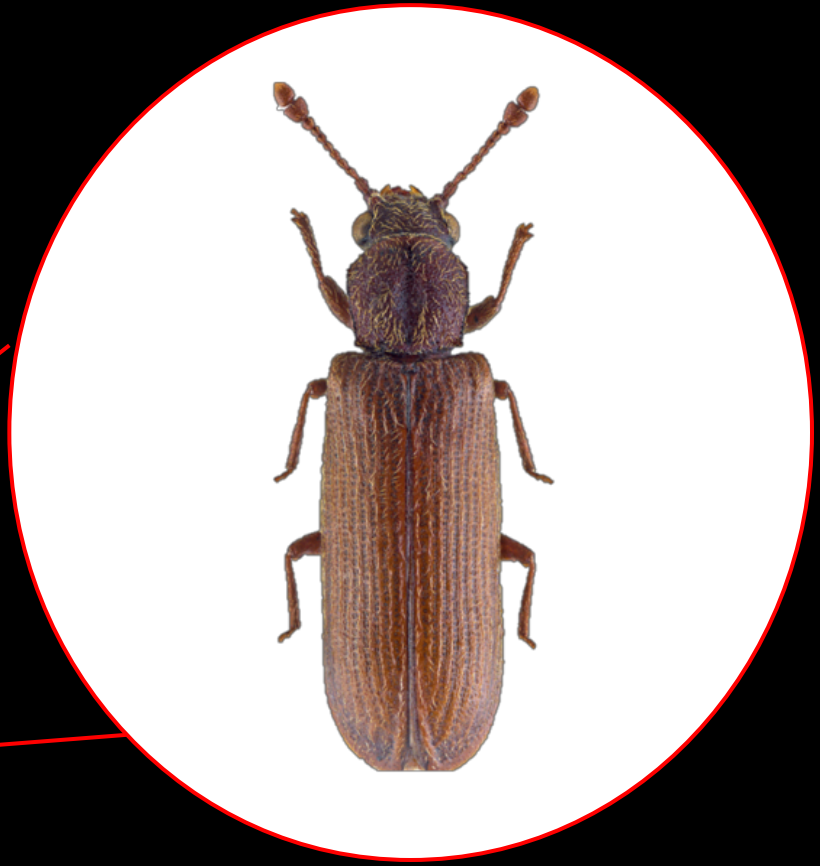
RLA Conservation of Art & Architecture

ARCS ASSOCIATION OF REGISTRARS AND COLLECTIONS SPECIALISTS

Presentation Focus:

- Conditions that can start or worsen infestations in your collection.
- The difference between indirect and direct infestation treatments.
- Different methods of direct treatment.
- Case Studies.
- How can you use this information in your collection.

Why do I have an insect infestation?



Reasons for an Infestation

Environment

- Insect activity at 75ºF and 70% RH

Food

- Larval phase typically the most dangerous
- Will eat anything that falls under their dietary requirement

  Example: Clothes moths will eat wool and dead animal hair.
  Silverfish eat paper and food crumbs

Collection Contamination

- Can occur when new acquisition brought in or old object returns from loan
- “Patient 0”
- Triage all objects entering the collection

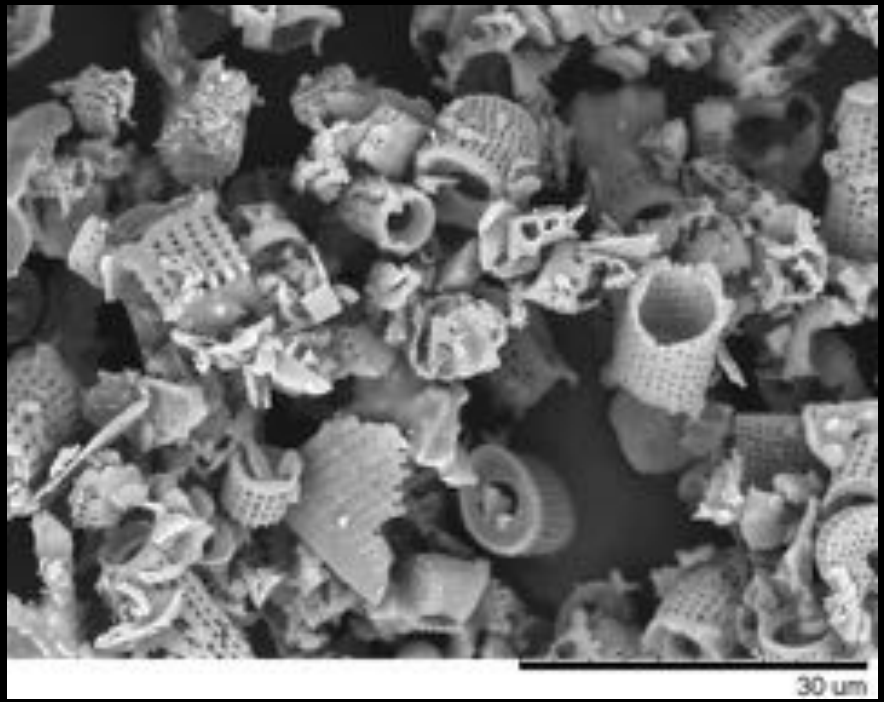
HOW DO I GET RID OF IT?

INDIRECT METHODS
- Blunder Traps
- Diatomaceous Earth
- Rodent Traps
- Biological Methods

DIRECT METHODS
- Anoxia
  - Oxygen absorption
  - Nitrogen displacement
- Freezing
- Fumigation

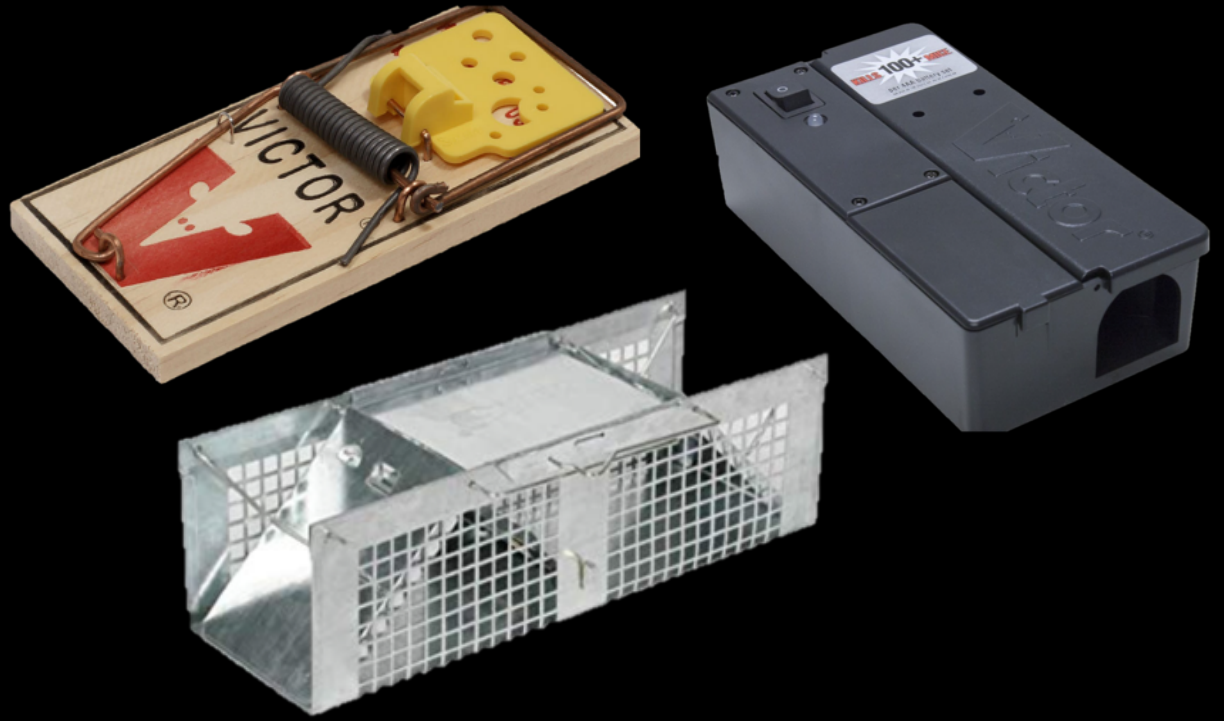
INDIRECT METHODS- Blunder Traps

INDIRECT METHODS- Diatomaceous Earth



SEM image of diatoms

INDIRECT METHODS- Rodent Traps



INDIRECT METHODS- Biological?

RUSSIA'S MUSEUM CATS

By Sally McGrane September 25, 2012

Winding beneath the magnificent halls of St. Petersburg's Hermitage Museum, with its Da Vincis, diamonds, Greek statuary, Egyptian parchments, enormous number of paintings, mechanical peacock clock, and other

Image courtesy of the British Museum.

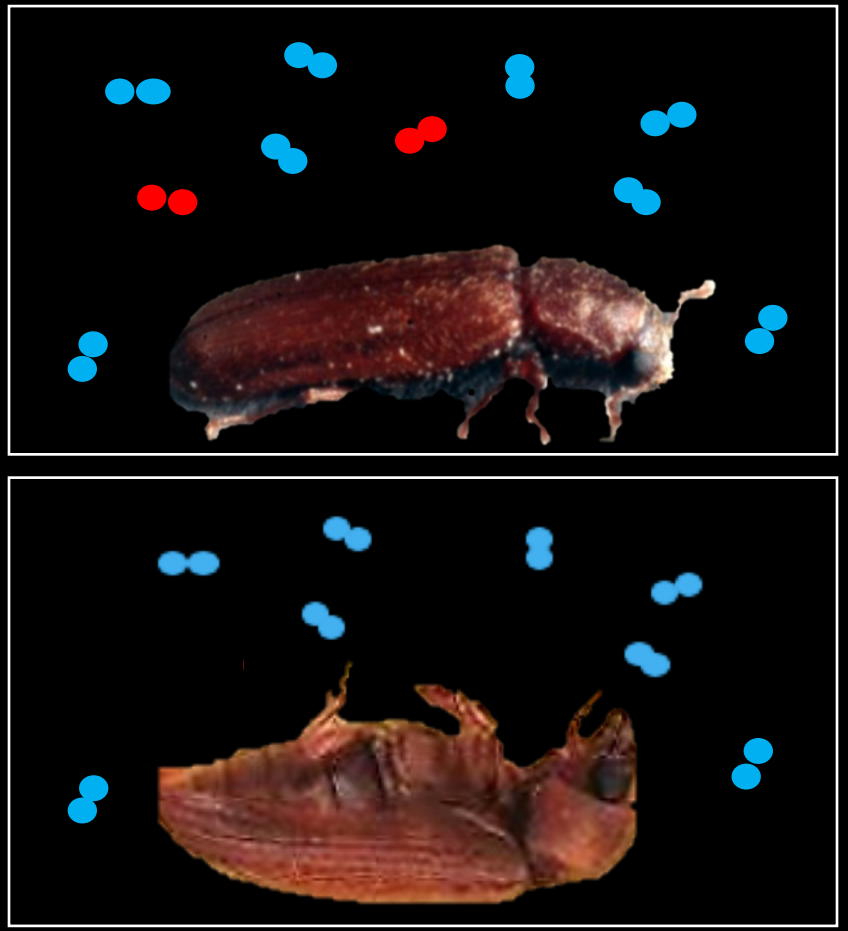
DIRECT METHODS- Anoxia

- What is anoxia?
  - ”an” = without
  - “oxia” = oxygen

= Oxygen

= Nitrogen

- Types of anoxia
  - Oxygen absorption
  - Nitrogen displacement



DIRECT METHODS- Oxygen Scavenging Anoxia

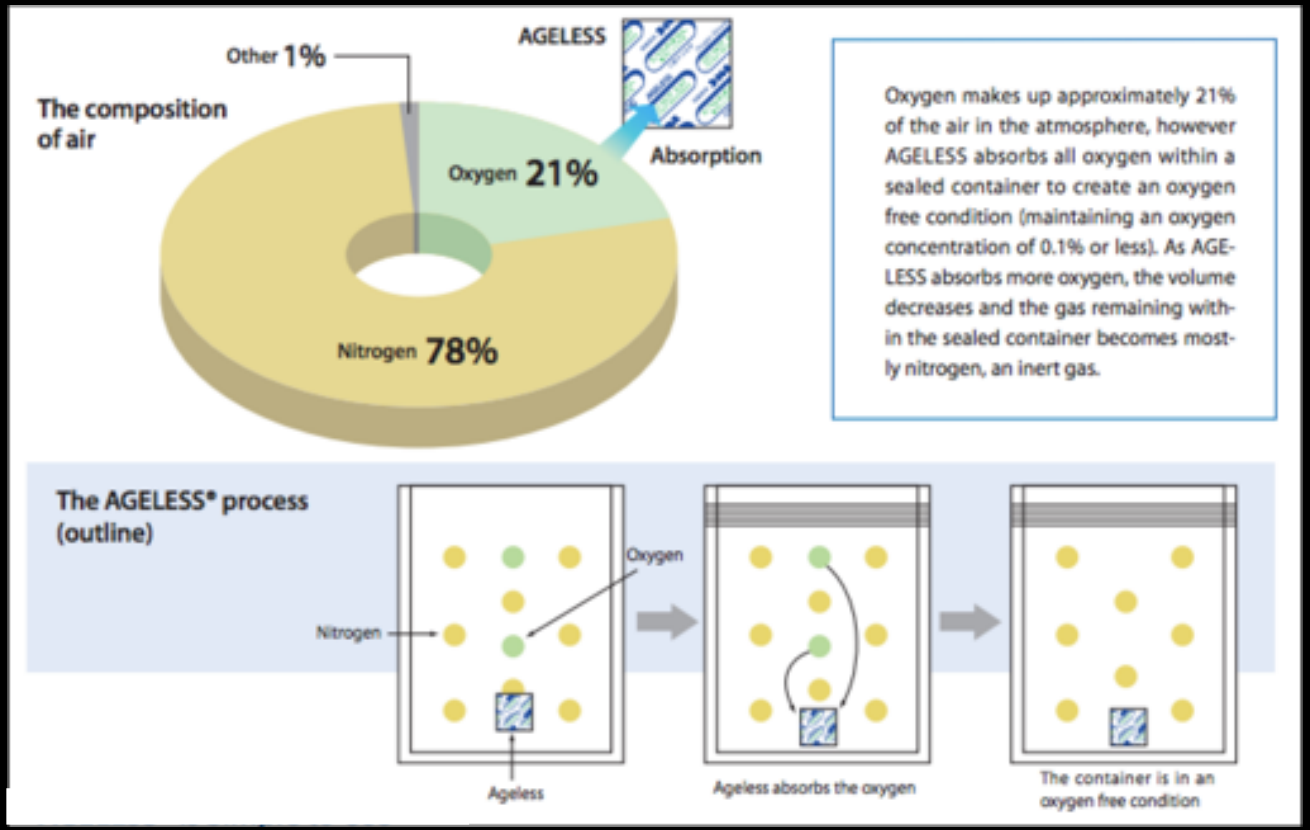


Diagram courtesy of Ageless®

DIRECT METHODS- Oxygen Scavenging Anoxia

Materials

MarvelSeal 360®- Oxygen and moisture impermeable membrane

DIRECT METHODS- Oxygen Scavenging Anoxia

Materials

Ageless®- Oxygen scavengers

ZPT-500 = Removes 500 cc's oxygen

ZPT-1000 = Removes 1000 cc's oxygen

ZPT-2000 = Removes 2000 cc's oxygen

DIRECT METHODS- Oxygen Scavenging Anoxia

Amount of Ageless® to Add

Volume of oxygen in your container= (volume of artwork/61.02)

Amount of Ageless ZPT-500 to add= (volume of oxygen X 0.2) x 2

Amount of Ageless ZPT-1000 to add= (volume of oxygen x 0.2)

Amount of Ageless ZPT-2000 to add= (volume of oxygen x 0.2) / 2

Please enter the dimensions of the artwork				
Height (in)	27		Volume of artwork (cubic inches):	79643.25
Width (in)	103.5		Total volume of oxygen (L):	1305
Depth (in)	28.5			
Below are the number of packets to use during anoxia.				
		Plus 25% more		
Ageless ZPT-500	522	131		
Ageless ZPT-1000	261	65		
Ageless ZPT-2000	131	33		
An additional 25% of Ageless packets can be included to account for potential enclosure leakage.				
Please note that more complicated calculations must be made if using a mixture of the types of Ageless.				

DIRECT METHODS- Oxygen Scavenging Anoxia

<u>Time in Anoxia</u>

2 days = time required for oxygen absorption

2 weeks = time required to kill active insects

2 weeks = time required to kill pupating insects and eggs

TOTAL TIME REQUIRED = 4 WEEKS + 2 DAYS

DIRECT METHODS- Oxygen Scavenging Anoxia

Downsides of Oxygen Scavenging Treatments

1. Time for treatment
2. Space availability
3. Fragility of materials
4. Reaction temperature
5. Pre-planning required

DIRECT METHODS- Nitrogen Displacement Anoxia

Nitrogen generator

Plastic Bubble Chambers

Rigid Chambers

DIRECT METHODS- Nitrogen Displacement Anoxia

Downsides of Oxygen Scavenging Treatments

1. Time for treatment
2. Space availability
3. Initial investment cost
4. Humidification requirements

DIRECT METHODS- Freezing

Kim Taylor, collections manager, removes a quilt from a freezer in the International Quilt Study Center and Museum's isolation room. New and returning quilts are placed in isolation to keep insects from entering the collection.- Photo courtesy of Troy Fedderson, University of Nebraska Communications

Photo courtesy of George Washington University Textile Museum

DIRECT METHODS- Freezing

Objects that cannot be frozen

- Inorganics sensitive to temperature changes.
- Composite organic and inorganic objects
- Wet objects
- Canvas and wood paintings
- Teeth and ivory
- Anything under tension, such as instruments.

DIRECT METHODS- Fumigation

Mild fumigants
- Dichlorvos
- Paradichlorobenzene
- Naphthalene
- oil of red cedar

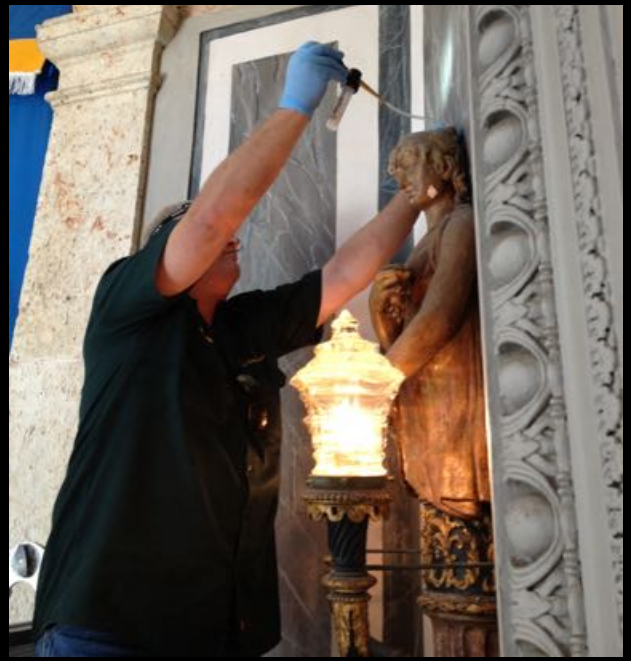
Highly toxic fumigants
- methyl bromide
- ethylene oxide
- sulfuryl fluoride
- Phosphine
- hydrogen cyanide

Fumigation should be the last line of defense against an insect infestation for safety of the objects and members of staff.

Only those trained to use chemical fumigants should come into contact with them!

CASE STUDY: CHARLOTTE PERRIAND BENCH

CASE STUDY: VIZCAYA WALL SCONCES



NOW WHAT?

IF YOU FIND A PEST INFESTATION…

1. Identify
2. Situate
3. Locate
4. Remove
5. Eliminate
6. Monitor

Resources:

- Florian, M-L. 1997. *Heritage Eaters: Insects and Fungi in Heritage Collections*. United Kingdom: Maney Publishing.
- Integrated Pest Management Working Group. 2012. *Fumigation with Toxic Gases*.
- Maekawa, S. and K. Elert. 2003. *The Use of Oxygen-Free Environments in the Control of Museum Insect Pests*. Los Angeles, Getty Publications.
- National Parks Service. 1994. *An Insect Pest Control Procedure: The Freezing Process* in Conserve O Gram, 3/6. 1-4