


**Session Three of Integrated Pest Management for Multifamily Housing**



www.StopPests.org

Find handouts for today's session at:  
<http://stoppests.org/go/usvi>

While we wait, please tell us in the chat:  
Do you have any personal experience with rodents?  
If yes, which ones?

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Session One Introduction

- Priority Pests
- Why IPM
- Pesticides & Health



www.StopPests.org

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Session One Introduction

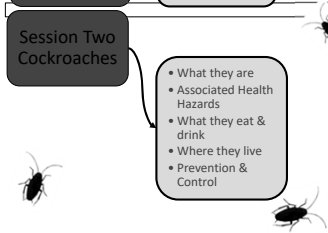
- Priority Pests
- Why IPM
- Pesticides & Health

Session Two Cockroaches

- What they are
- Associated Health Hazards
- What they eat & drink
- Where they live
- Prevention & Control



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Session One Introduction

- Priority Pests
- Why IPM
- Pesticides & Health

Session Two Cockroaches

- What they are
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- What they eat & drink
- Where they live
- Prevention & Control

Session Three Rodents

Pigeons

**STOP Pests**  
in housing  
www.StopPests.org

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**Session Three - Meet Your Trainers**

**STOP Pests**  
in housing  
www.StopPests.org

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Any Questions from Session Two  
Cockroaches

**?**

**STOP Pests**  
in housing  
www.StopPests.org

Raise your hand to un-mute, or send to  
Susannah K. Reese <sck27@cornell.edu>

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Homework from Session 2  
Cockroaches – **Who Does What?**

- Monitoring
- Sanitation/Cleaning
- Exclusion
- Repairing Leaks
- Apply Pesticides

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Homework from Session 2  
Cockroaches – **Contract Language?**

- No routine spraying or pyrethroid sprays
- Use monitors in halls/units
- Treat with bait, dust, IGR based on monitor counts
- Follow-up schedule (2-4 weeks)
- Bait Rotation schedule

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**What's Missing?**

Please chat or un-mute!

What challenges did you encounter in your discussions?  
Did you add any responsibilities to the list?

(Raise your hand to be unmuted)

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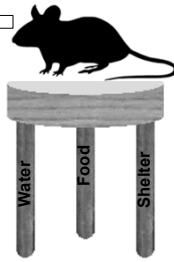
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### What All Pests Need

- Food
- Water
- Shelter




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### Know Your Priority Pests

- **Cockroaches** cause asthma in infants, trigger asthma attacks, and contaminate food
- **Rodents** such as mice and rats carry diseases, bite, destroy property, may cause fires, and may trigger asthma attacks
- **Bed Bugs** and their bites are a nuisance and are expensive to eliminate

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### Poll: On average, what type of rodent activity have you seen at your properties?

- Indoor mice
- Indoor rats
- Outdoor rats
- Evidence of rodent droppings indoors
- None
- Don't know

Select all that apply.

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### What is a Rodent?

Many kinds:

- Rats
- Mice
- Squirrels
- Chipmunks
- Woodchucks

➤ Mice & Rats are our focus




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### What is a Rodent?

➤ Gnaw to create holes and pathways

- Wood, plastics, hoses, sheetrock, copper, wires, etc.




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### What is a Rodent?

➤ Gnaw to create holes and pathways

- Wood, plastics, hoses, sheetrock, copper, wires, etc.

➤ Make lots of babies fast




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### What is a Rodent?

- Gnaw to create holes and pathways
  - Wood, plastics, hoses, sheetrock, copper, wires, etc.
- Make lots of babies fast
- Most active during the first two hours after dusk




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### What is a Rodent?

- Gnaw to create holes and pathways
  - Wood, plastics, hoses, sheetrock, copper, wires, etc.
- Make lots of babies fast
- Most active during the first two hours after dusk
- Travel the same paths nightly, close to walls or items that give them cover




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### Mice

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- Deer Mouse

- *Peromyscus maniculatus*

- House Mouse

- *Mus musculus*




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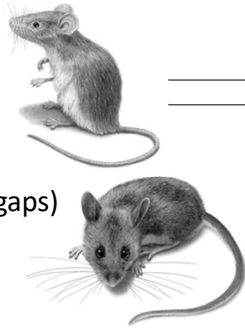
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# Mice

- Mostly indoors
- Travel 10-30 feet from their nest
- Entry size: dime (close 1/4" gaps)



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# Mice

- Nibble during the night
- Food: 0.1 oz daily
- Rarely drink



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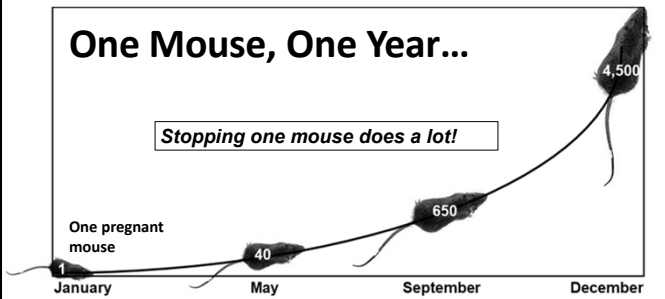
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# One Mouse, One Year...

*Stopping one mouse does a lot!*



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**Poll: Which of the following are TRUE statements about mice?**

1. Get most of their water from their food
2. Make asthma worse in sensitive people
3. Can squeeze through a ¼ inch gap
4. Will be easily stopped by foam sealants

Select all that apply.

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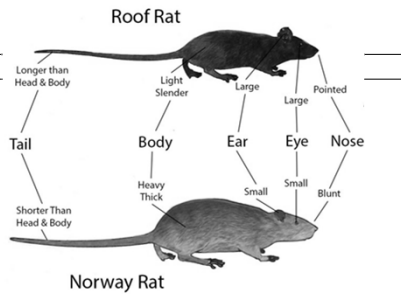
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**Rats**

•Roof Rat  
• *Rattus rattus*

•Norway Rat  
• *Rattus norvegicus*




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**Norway Rat**




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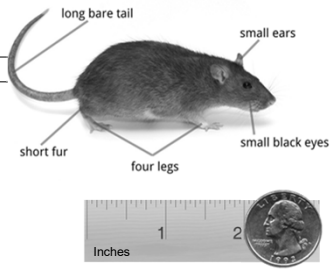
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# Rats

- Live mostly outdoors
- Entry size: Quarter or a 1/2 inch crack




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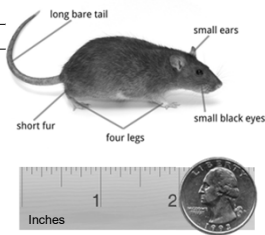
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# Rats

- Live mostly outdoors
- Entry size: Quarter or a 1/2 inch crack
- Very smart, cautious, and afraid of new things
- Need ~1 ounces of water every day
- Require 0.5–2.5 ounces of food each day




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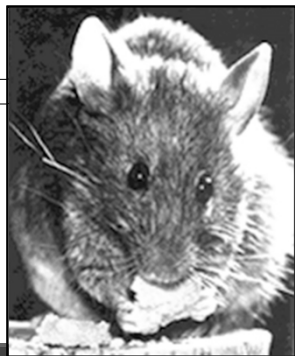
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# Rodents are Health Hazards

Rodents and their waste:

- Cause or aggravate asthma and allergies




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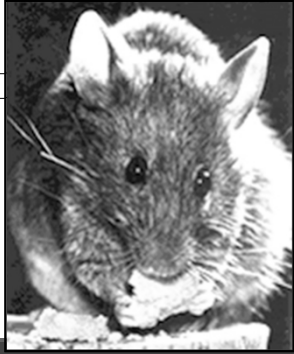
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### Rodents are Health Hazards

Rodents and their waste:

- Cause or aggravate asthma and allergies
- Can carry infectious diseases




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### Rodents are Health Hazards

Rodents and their waste:

- Cause or aggravate asthma and allergies
- Can carry infectious diseases
- Bite




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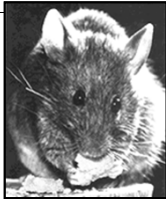
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### Rodents are Health Hazards

Rodents and their waste:

- Cause or aggravate asthma and allergies
- Can carry infectious diseases
- Bite
- Contaminate and damage food




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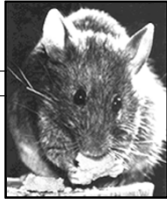
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### Rodents are Health Hazards

Rodents and their waste:

- Cause or aggravate asthma and allergies
- Can carry infectious diseases
- Bite
- Contaminate and damage food
- Are unwelcome where we work and play



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### Rodents are Health Hazards

Rodents and their waste:

- Cause or aggravate asthma and allergies
- Can carry infectious diseases
- Bite
- Contaminate and damage food
- Are unwelcome where we work and play
- Chew wires and create fire hazards



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### The Asthma Connection



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## Rodents Violate Housing Program and Codes

According to HUD's Real Estate Assessment Center (aka REAC) the observation of any of the following is defined as an infestation:

- Droppings or chewable holes
- One or more live rats or mice
- Other insects or vermin observed




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## Where Mice Nest

- Walls
- Beneath refrigerators & stoves
- Inside stoves
- Cabinets, closets
- Couches & chairs
- Stored cardboard boxes
- Ceiling



Mouse nest in a hat

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## Where Rats Live

- Exterior burrows, usually associated with trash
- Prefer to live close to food and water
- Will travel up to 450 feet from burrow




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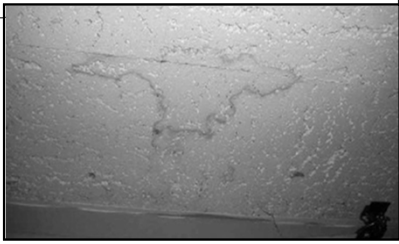
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### Where Rats Live

- In high-rise buildings, rats will infest dropped ceilings, wall voids and basements
- And crawl spaces if food trash collects along the exterior
- Food scraps left in a trash compactor chute will also attract them



Rodent urine stain in dropped ceiling

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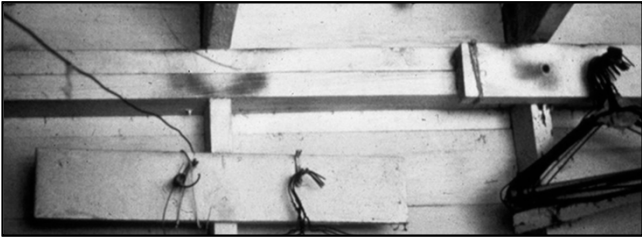
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### Where Rats Live



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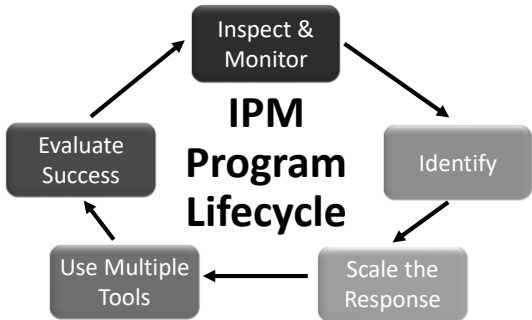
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### IPM Program Lifecycle



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### Inspect & Monitor



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### Thorough Inspection – Look Under and Behind



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### Thorough Inspection – Look Under and Behind



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## Thorough Inspection – Remote Sensing Monitors



Photo credit: PMP Magazine

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## Signs of Rodents

- Droppings
- Dog or cat alerts
- Rub marks
- Indicator pests
- Smell
- Sightings
- Noise
- Gnaw marks
- Holes
- Nests



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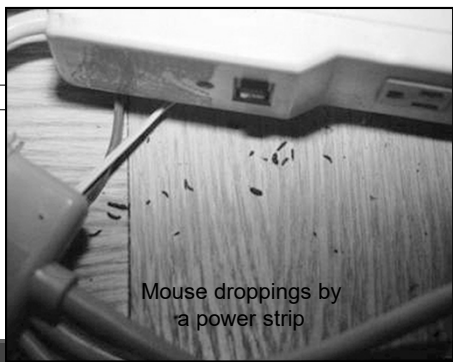
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## Droppings & Urine Stains



Mouse droppings by a power strip

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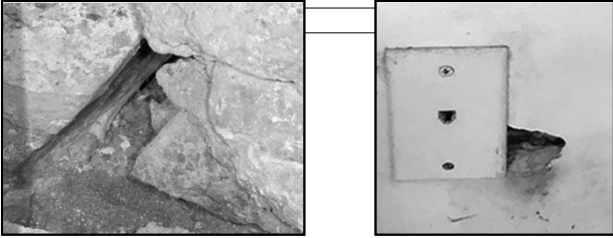
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### Holes and Rub Marks



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### Sebum and Urine Stains



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### Not-So Obvious Signs...



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### Mice in Stoves



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### Rat Burrows



Photo credit Jayne Windham

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### Inspect

- Using a flashlight, look for evidence where rodents would find food, water, or a hiding spot: up, down, behind, and under
- Think like a rodent – look in hidden areas



Under sink

Mechanical room

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# Identify

Check the evidence:

- Is it a mouse?
- A rat?
- What kind?




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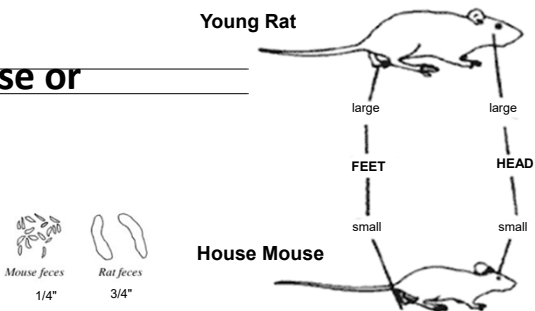
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## Mouse or Rat?




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Can you identify this rodent?

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**Poll: Which of the following are TRUE statements about Norway rats?**

- 1. Live mostly outdoors in burrows
- 2. Live near food sources
- 3. Can squeeze through an opening the size of a quarter
- 4. Will be easily stopped by foam sealants

Select all that apply.

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**Scale the Response**

How many rodents do we have?




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**Use Multiple Tools**

- Sanitation
- Exclusion
- Non-Chemical Solutions
  - Traps
- Targeted Chemical Use
  - Rodenticides
  - Only by Licensed Professionals




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## Sanitation

- Eliminate hiding spots
- Eliminate access to food and water



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## Eliminate Harborage

- Eliminate hiding spots
- Eliminate access to food and water



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## Don't Simply Relocate the Problem

An effort to hide the contents from the mice



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### Food Can Be Found Under The Hood

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Abundant mouse feces below the stove burner plate



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### Eliminate Access to Food & Water

Recycling  
Trash  
Dumpsters



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### Trash & Recycling = Food to a Pest

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- ✓ Wash recyclable containers
- ✓ Metal bins when practical
- ✓ Line bins with garbage bags
- ✓ Wash bins with detergent
- ✓ Tight fitting lids
- ✓ Frequent pick-up

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### About Dumpsters

- Tightly covered
- Monitored
- Empty dumpsters regularly



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### About Dumpsters

- Tightly covered
- Monitored
- Empty dumpsters regularly



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### About Dumpsters

- Free of holes
- Placed on concrete
- Screen drain holes



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**Cleaning up after rodents is critical to human health**

- Mouse urine and droppings trigger asthma and allergies.
- They also carry disease-causing pathogens.

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**Take precautions before and during clean up of rodent-infested areas**

- Prevent exposure to urine and droppings
  - You may need to clean, trap, and clean again
- Trap rodents for one week
- Seal up any entry ways



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### Prevent Exposure to Urine and Dropping

- Trap rodents for one week
- Seal up any entry ways
- Ventilate (open doors and windows)



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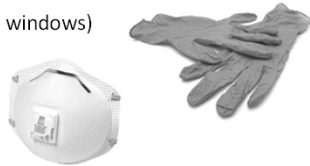
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### CDC Recommendations for Cleaning Mouse Urine and Droppings

- Trap rodents for one week
- Seal up any entry ways
- Ventilate (open doors and windows)
- Wear PPE



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### Do Not Sweep or Vacuum

- Disinfect first - Don't stir up dust by vacuuming or sweeping



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### CDC Recommendations for Cleaning Mouse Urine and Droppings

- Disinfect first - Don't stir up by vacuuming or sweeping
- Spray the nest, urine, and droppings with disinfectant or a mixture of bleach and water
  - One part bleach to 10 parts water
  - Let soak 5 minutes
  - Follow the label for commercial disinfectant



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### CDC Recommendations for Cleaning Mouse Urine and Droppings

- Wear PPE
- Spray the nest, urine, and droppings with disinfectant or a mixture of bleach and water
  - One part bleach to 10 parts water
  - Let soak 5 minutes
  - Follow the label for commercial disinfectant
- Use paper towels to pick up the urine and droppings
- Dispose of waste in sealed bag



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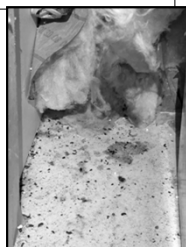
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### CDC Recommendations for Cleaning Mouse Urine and Droppings

- Wear PPE
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  - Let soak 5 minutes
  - Follow the label for commercial disinfectant
- Use paper towels to pick up the urine and droppings
- Dispose of waste in sealed bag



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## Non-Chemical Solutions: Exclusion

Got rats?

- Trap first, then seal



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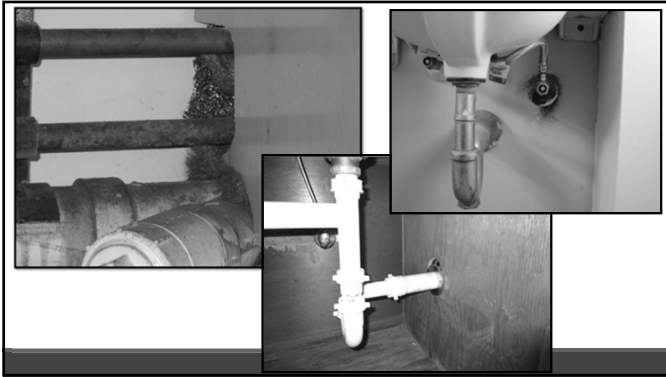
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## Exclusion

Eliminate pest access  
in plumbing systems:

- Sill cocks
- Utility lines
- Sewer lines
- Other openings



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### Exclusion: Find the Gaps

HVAC Components

- Piping
- Duct work
- Wires
- Conduits

Intersections with floors, walls, or ceilings



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### Exclusion: Find the Gaps



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### Exclusion

Repairing holes, cracks and gaps...



Stuff it

- Start on the outside of the building and work in

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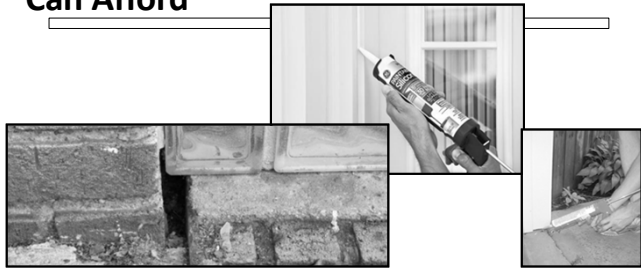
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### Use the best Caulks and Sealants You Can Afford




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### Copper Mesh

- Woven copper cloth - difficult for rodents to chew through.
- Stuff in gaps around pipe, ductwork and wiring penetrations
- Use in openings smaller than 2".
- Repair larger openings with standard building materials.
- Won't rust or stain brick, siding, or stucco



*Can be cut with scissors, yet it will cut up mouth parts of animals that attempt to chew through it.*

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### Exclusion

Repairing holes, cracks and gaps...



Stuff it



Seal it

- Start on the outside of the building and work in
- Use appropriate materials

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## Exclusion

Repairing holes, cracks and gaps...



Stuff it



Seal it



Check it often

- Start on the outside of the building and work in
- Use appropriate materials
- Check repairs over time

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## Door Sweep Construction Detail



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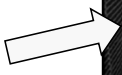
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## Exclusion

Having a Good (but messy) Day



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### Exclusion: Repair These

- Broken windows, screens, vent covers or holes in exterior walls
- Doors and windows that do not completely close




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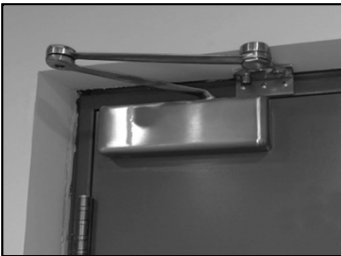
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### Exclusion: Install These



- Automatic door closers**
  - Frequently used, tend to be left open
  - Food or trash is present
- Screens**
  - Air intake and exhaust vents for HVAC systems
  - Doors, hatches, skylights

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### Poll: Is exclusion part of your IPM treatment?

- Yes, The PMP includes this service
- Yes, PMP directs our staff what to seal
- Yes, our staff regularly looks for entry points
- No, exclusion is not part of our treatment
- I don't know

Select one.

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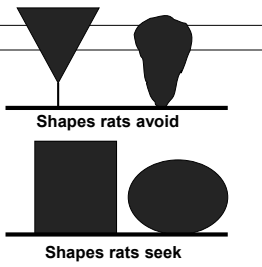
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### Landscaping

- Plant choices that resist pests naturally
- Plant maintenance



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### Another Kind of "No Pest Strip"

- Rodents do not like open spaces
- Break up large areas of cover with wide stone/gravel walkways
- Keep foliage away (at least 3ft) from buildings
- Trim overhanging tree branches



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### Non-Chemical Solutions: Traps

- Effective & Re-usable



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### Non-Chemical Solutions: Traps

- Effective & Re-usable



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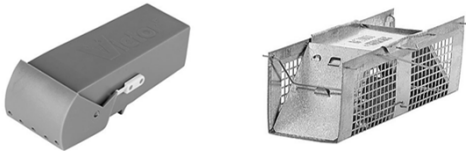
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### Non-Chemical Solutions: Traps

- Effective & Re-usable
- Live traps?



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### Non-Chemical Solutions: Traps

- Effective & Re-usable



Bait with food or nesting materials

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## Non-Chemical Solutions: Traps

- Effective & Re-usable
- Placement is key



Photo credit NYS IPM

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## Non-Chemical Solutions: Traps

- Effective & Re-usable
- Placement is key
- Bait & set many traps
  - 6 traps for each mouse



Bait with food or nesting materials

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## Non-Chemical Solutions: Traps

- Effective & Re-usable
- Placement is key
- Bait & set many traps
  - 6 traps for each mouse
- May set immediately
- More effective if left unset and re-baited for a day or two



Bait with food or nesting materials

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## How to Trap Rats

- Place many traps
- Bait with **familiar food** and leave UNSET until rats are readily feeding
- Bait & set all traps simultaneously



Image credit: animalaticpest.com

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## About Glue Boards...



Adults won't "stick" around.



Juvenile catch indicates nest is nearby

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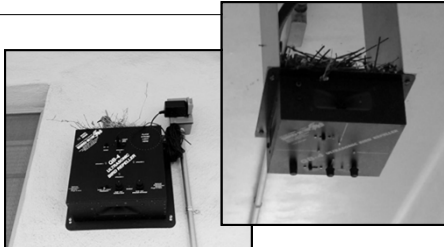
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## About Ultrasonic Repellants...

Just don't.



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### About Mouse Repellants...



Just don't.

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### About Tracking Powders...

Just don't.

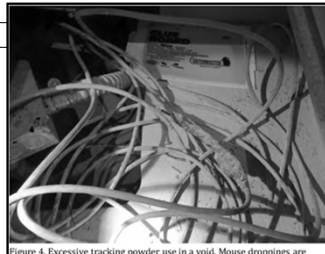


Figure 4. Excessive tracking powder use in a void. Mouse droppings are visible as texture under powder to the right of the image.

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### Targeted Chemical Use by PMP

- Ideally, sanitation first
- Inspect before treatment
- Exclusion & traps next
- Only licensed individuals should apply pesticides

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## Rodenticides Alone Won't Work



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## Rodenticides (Pesticides) Can Harm Humans

- Rodenticides are designed to kill mammals
- Rodenticide poisonings reported in US\*:
  - 2002 – 20,507
  - 2018 – 9,029



\*Poison Control Center

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## Targeted Chemical Use - Baits



- The label is the law
- Tamper-resistant stations
- Read the label on both the station and the bait
- Bait station should be:
  - Secured
  - Locked
  - Labeled
- If rodents are inside, consider using traps



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### Bait Stations Must be Maintained



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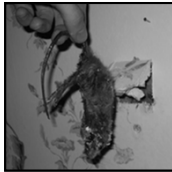
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### What's That Smell?

Where did you *think* they'd go to die?



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### Rodenticides?

**Please chat!**

Almost all approaches to pest management have pros and cons.

What are some of the "pros" & "cons" of using rodenticides?

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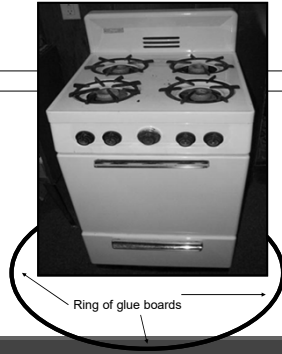
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## Resident Mice: Cleanout

Prevent resident mice from escaping

- Surround stove with a ring of glue boards
- Remove the sides of stove
- Any escaping mice are caught on glue boards



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## Rat Prevention and Control: Dry Ice

- Suffocates rather than poisons
- Used only in outdoor burrows
- Not approved in all states
- Requires caution when handling



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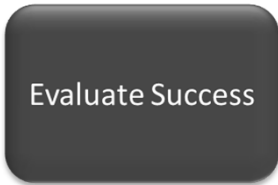
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## Evaluate Success



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## Recordkeeping

Find this log at [StopPests.org](http://StopPests.org)

- Identify:
  - Rat or Mouse
- Location & Date
- How Many
- Obvious food source
- Note Action Taken
- Follow-up

**FOCUS UNIT TRACKING LOG**

Name/Address of Property: \_\_\_\_\_

The IPM team identifies areas or units of focus and coordinates IPM efforts. This sheet unites pest control, housing, and maintenance record-keeping systems. Keep it in the front of the IPM log.

Date	Unit / Location	Name of Staff Member / Technician	Pest Level	Repairs Needed	Recent or Current Focus Unit?	Housekeeping / Lease Compliance	
						Housekeeping Issue? (Y/N/C/N/A)	Action taken in g. met with tenant, sent violation notice?
			Note any pests and circle the level of infestation. Include date IPM.	Work order number or problem description	Check when completed	Yes or No	
			Type of Pest:				
			Light Moderate Heavy				C F P
			Type of Pest:				C F P
			Light Moderate Heavy				C F P
			Type of Pest:				C F P
			Light Moderate Heavy				C F P
			Type of Pest:				C F P
			Light Moderate Heavy				C F P

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## Resident Control

- Clean up spilled food right away
- Wash dishes and cooking utensils soon after use
- Keep outside cooking areas/grills clean
- No pet-food or water bowls out overnight
- Thick plastic/metal garbage can with a tight lid
- Keep compost bins away




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## Resident Education

- Signs of mice
- How to report



Find this document at [stoppests.org](http://stoppests.org)

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# IPM Practice

## Please chat!

Examine each photo, then tell us:

- What's the problem here?
- How would you fix it?
  - Who is responsible?

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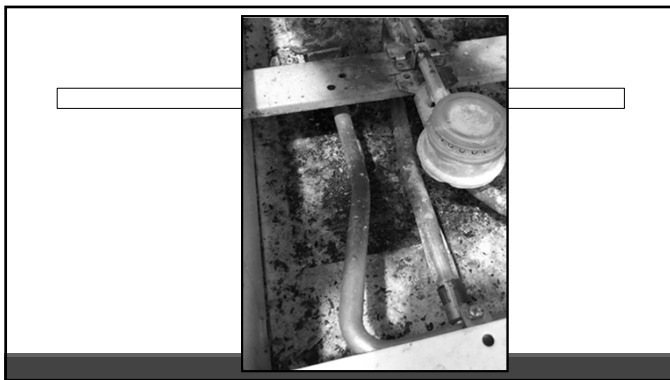
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The sealant:

- Blocks the entry of pests that can damage the house and its contents
- Contains no pesticides

**BLOCK OUT PESTS**  
PESTBLOCK INSULATING FOAM SEALANT

PESTBLOCK Insulating Foam Sealant blocks and seals the entry of insects and rodents that enter through tiny openings in walls, windows, doors, and other openings.

**APPLICABLE PESTS AND RODENTS**

PESTBLOCK Insulating Foam Sealant blocks and seals the entry of insects and rodents that enter through tiny openings in walls, windows, doors, and other openings.

**The sealant:**

- Blocks the entry of insects that can damage the house and its contents
- Contains no pesticides
- Forms a strong barrier against insect and rodent entry
- Reduces the number of insects and rodents that enter the house
- Blocks the entry of insects and rodents that enter through tiny openings in walls, windows, doors, and other openings

**REPEL PESTS**

PESTBLOCK Insulating Foam Sealant repels and deters the entry of insects and rodents through tiny openings in walls, windows, doors, and other openings.

**RISK**

PESTBLOCK Insulating Foam Sealant is a low-toxicity, non-flammable, and non-toxic foam sealant.

**REPEL PESTS**

- Insects
- Ants
- Fleas
- Cockroaches
- Other insects
- Mice
- Other rodents

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## Doves and Pigeons



Scaly-naped pigeons

Photo by Deanna Somerville  
<https://www.nps.gov/viis/learn/nature/forestbirdsvi.htm>



Rock dove (pigeon)

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## Why be Concerned?

- Droppings can spread disease
  - Allergens
  - Bacteria
- Avian mites, fleas, ticks
- Droppings are corrosive



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## Minor Risk of Health Concerns



- CDC: There is little evidence linking pigeons directly to human infections
  - Disease outbreaks directly attributed to pigeons are rare
  - Droppings can contaminate cisterns

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## Cleaning up Pigeon Droppings



### Small Projects

•Routine cleaning of droppings does not pose a serious health risk to most people.

### Large Projects

- Wear protective clothing
- Minimize dust when using a high-powered water hose
- Soak the droppings in water and shovel them
- After an area is clean, wash it regularly to prevent future buildup.

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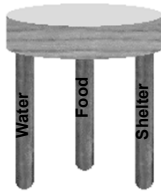
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## Three steps to humanely solve a pigeon problem

- Stop **watering** and **feeding** them
  - Intentional and Unintentional
- Shelter**
  - Exclusion (Make them less comfortable)
  - Dating bars?




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## Prevent Roosting and Nesting: Exclusion

- Change ledge angles
- Screening
- Bird spikes
- Strands of wire
- Monofilament grid systems



Images: extension.Missouri.edu Bird Slide Birdbarrier.com

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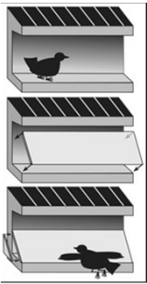
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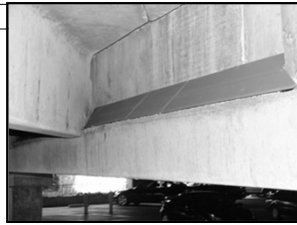
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### Non-Chemical Solutions



Increasing the angle of a ledge to at least 45 degrees discourages roosting



Images: extension.Missouri.edu and Bird Slide Birdbarrier.com

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### Non-Chemical Solutions

Netting can be used to exclude birds from rafters

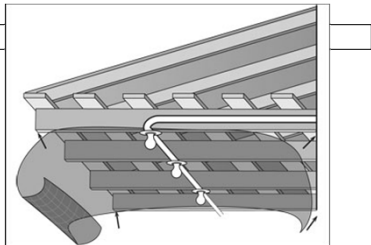


Image: extension.Missouri.edu

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### Non-Chemical Solutions

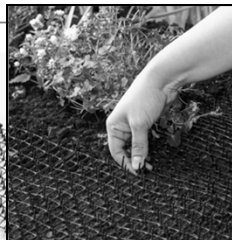
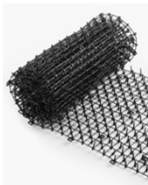


Image: amazon.com

Image: leevalley.com

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## Non-Chemical Solutions



Image: tractorsupply.com



Image: leevalley.com

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## Non-Chemical & DIY Solutions



Image: Hausse



Image: Amazon.com



Image: Jayne Windham

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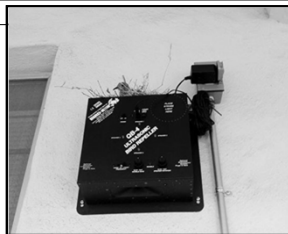
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## What doesn't work

- Avian poisons
- Noise-making devices
- High frequency (ultrasonic) devices
- Balloons
- Fake predators (rubber snakes, owls)



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### Say "No" to Gel Repellents



Sticky gel repellents can harm all birds and any animal that come in contact with it

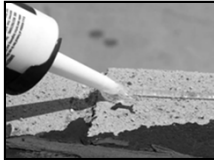


Image: Home Depot

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### Pigeon Contraception: OvoControl



- A kibble-type food that limits growth of pigeon flocks
- Causes birds who eat it regularly to lay eggs that fail to develop



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Session One Introduction

Session Two Cockroaches

Session Three Rodents

Pigeons

- Priority Pests
- Why IPM
- Pesticides & Health

- What they are
- Associated Health Hazards
- What they eat & drink
- Where they live
- Prevention & Control

**STOP**  
**Pests**  
**in housing**

[www.StopPests.org](http://www.StopPests.org)

What we learned...

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Homework for Session 3  
Rodents – **Who Does What?**

- Encourage reporting
- Sanitation
- Exclusion
- Placing/Emptying Traps
- Checking/Cleaning Appliances

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Homework for Session 3  
Rodents – **Contract Language?**

- Cleaning Rodent Residual
- Mouse (appliance) Cleanout
- Traps: Placement and Monitoring
- Rodenticides

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**STOPpests.org**

Webinars Request Training Find Solutions Search

Webinars on Pest Control Acting the Greenway

**IPM Guides Free Download**

**News You Can Use**

March 21, 2022 **IPM in Multifamily Housing Live Online Course April 21st - May 15th, 2022** Live online course offered Thursday, April 21st - May 15th, 2022. Register for this Course description: The IPM in Multifamily Housing Course was designed to help housing professionals enhance their skills in identifying risks and assess and control in their communities. The course outlines how to manage [bed bug infestations](#).

**New residential IPM guides for property managers on cockroaches and bed bugs** (1/17/22) IPM guides issued guides for residents on cockroaches, rodents, and bed bugs (1/17/22).

**Looking for training on rodents?** Find resources and materials under identifier 10206. **Looking for training on bed bugs?** Find resources and materials under identifier 10205. **Looking for training on Pest Exclusion Program for Cockroaches and IPM** (1/17/22) for identifying risks from Multifamily Housing. Find more training opportunities (1/17/22).

**ABOUT US** | **WHAT IS IPM?** | **WORKING WITH RESIDENTS** | **IPM TRAINING** | **SUCCESS STORIES**  
 | Staff and Partners | | Definitions | | Resident Staffing Maps | | Online Course | | Evaluate Your Success  
 | Participating Providers | | Using IPM | | Help with Housekeeping | | The Training Day | | Case Studies  
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