

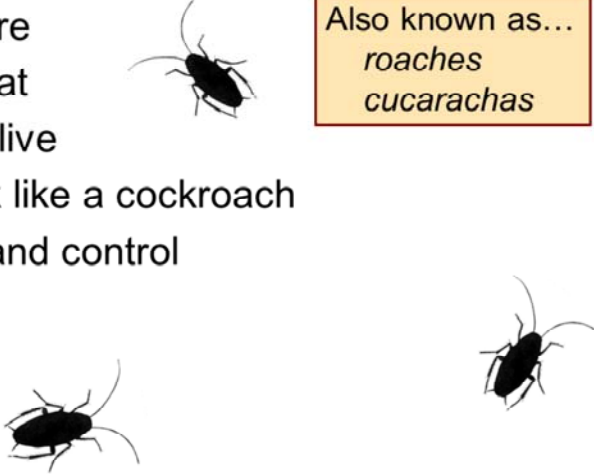
Ver. 4/2014 Rev. 5/2014

This presentation deals with controlling cockroaches.

## Outline

- What they are
- What they eat
- Where they live
- How to think like a cockroach
- Prevention and control

Also known as...  
*roaches*  
*cucarachas*



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Here is an outline of this presentation.

## Cockroaches are health hazards

### Cockroaches and their frass

- Make asthma worse in sensitive people
- Cause asthma in preschool-aged children
- Cause or aggravate allergies
- Contaminate food, dishes, and counters
- Are unwelcome in places where we work and play

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The research on the asthma connections are based on the German cockroaches. For peer-reviewed research about cockroaches, visit [www.stoppests.org/Research](http://www.stoppests.org/Research).

*Introduce the word “frass,” which is the poop produced by insects. Cockroaches communicate by smelling and tasting frass.*

For sensitive people with asthma, eight units of cockroach allergen per gram of dust can trigger a reaction. ONE female cockroach will produce 1500 units per day! One cockroach and its frass can be an asthma trigger. An IPM program should work to eliminate the cockroaches and clean up the frass. The repairs and measures taken to control one cockroach will benefit the building in more ways than just pest control.

*Help the trainees understand that the asthma connection comes from frass and body parts that the cockroaches leave behind. Getting rid of the infestation helps, but does not remove the remains. Cleaning using simple soap (not smelly cleaning agents) will remove the allergens, remove the cockroaches’ mode of communication, and allow residents and staff to see when new evidence shows up.*

*Have the trainees think about all the areas where cockroach infestations could be health hazards: childcare facilities, recreation rooms, workplaces...*

Reference: National Academies Press, 2000. Clearing the Air: Asthma and Indoor Air Exposures. Executive Summary Institute of Medicine. ISBN 0-309-06496-1. See [www.nap.edu/books/0309064961/html/](http://www.nap.edu/books/0309064961/html/).

## What is a cockroach?

- An insect
  - Lives in areas where humans provide food and water
  - Active at night
- If you see cockroaches during the day, the infestation is serious

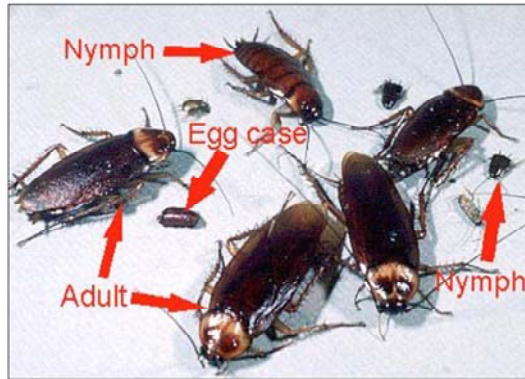
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Cockroaches are a good indicator of the need for improved sanitation in an area.

*Clear up confusion by stating that a "roach" and a "cockroach" refer to the same thing; they are not two different insects. All cockroaches have two little spikes on their back end called "cerci."*

## What is a cockroach?

- Multiple eggs in each egg case
- Many eggs means many nymphs (babies)
- Nymphs look like small versions of the adults

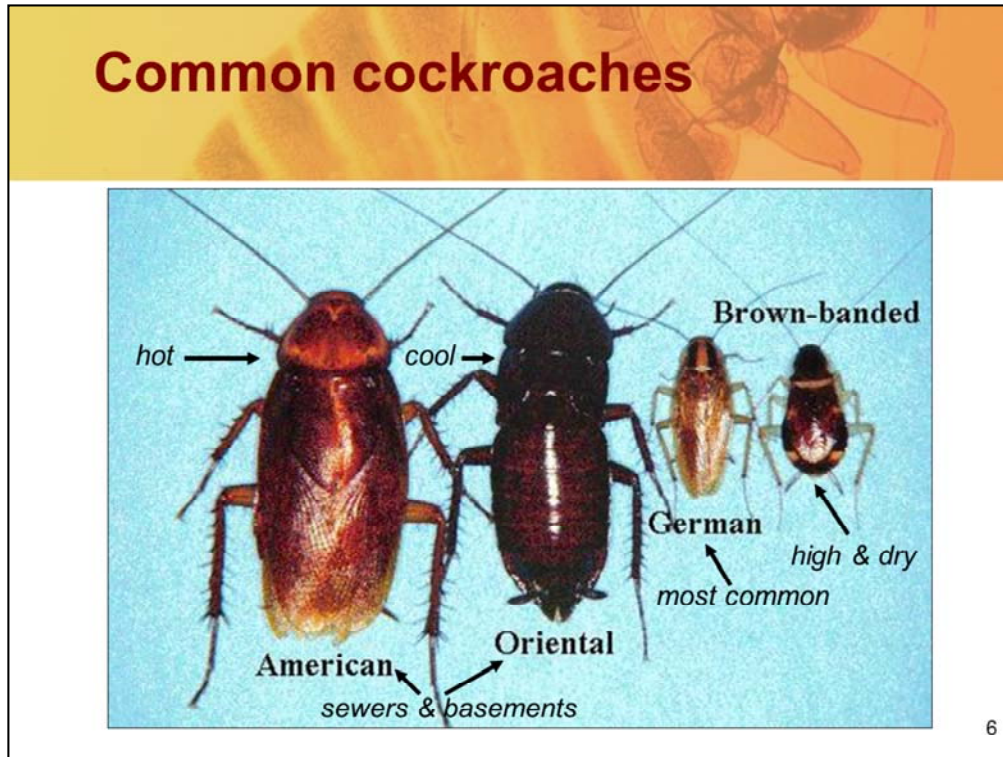


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Trainees don't need to be experts on all pests, but they need to know the basic biology and behavior of pests in their buildings.

Suggestion: avoid using the term "instars." Nymph is the term used throughout the training. There is no need to explain complete versus incomplete metamorphosis. Note that if the pest has wings, it is an adult. If it does not have wings it is either a nymph or a wingless type of cockroach.

*Use this picture to point out the cerci mentioned on the previous slide.*



Four types of cockroaches found in public housing are of concern. German Cockroaches have the highest priority. Other kinds of cockroaches exist, but are not covered here because they are not found in large numbers in buildings. These non-pest kinds usually are carried into buildings by accident.

Different kinds of cockroaches have different preferences for food and shelter. American cockroaches like hot environments; Oriental cockroaches like cool environments. Brownbanded cockroaches like to be “high and dry.”

American and Oriental cockroaches are invaders. They typically enter the home seeking food or water but do not remain in large numbers.

German (especially) and Brownbanded cockroaches are infesters. They take up residence in the home when adequate food, water, and harborage are found and their populations may grow exponentially.

*Trainees should be able to identify American, Oriental, and German cockroaches.*

## German cockroach

- Medium size (3/4"), bronze, with "racing stripes" behind the head
- Found everywhere, but likes warmth, moisture, and darkness
- Reproduces quickly
- Mother carries eggs to term even if she is dead
- Eats almost anything





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There is a connection between German cockroach and asthma.

German cockroaches live in the areas we live in. They like to be in our homes. They like warmth.

They are more effective reproducers than the other cockroaches in a variety of ways. They are quicker to reproduce, the egg cases hold more cockroaches, and the eggs are more likely to survive because they are held inside the mother until one day before they hatch. If she dies, when the eggs are almost ready to hatch they will still hatch, so it is important to clean up dead cockroaches.

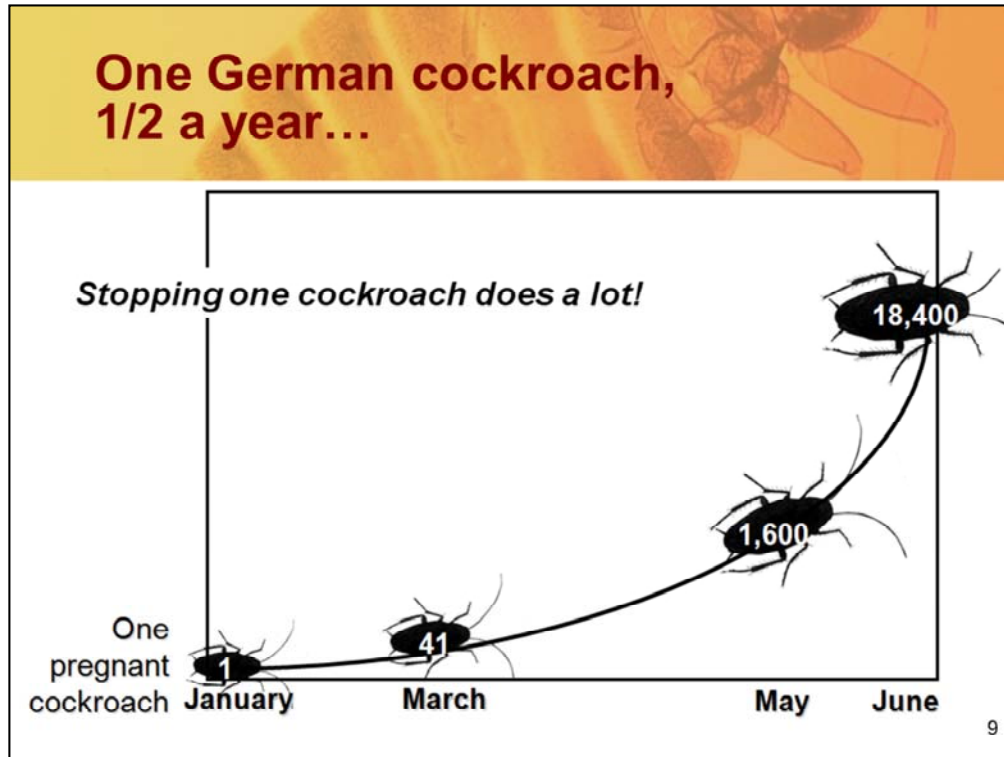


<b>American cockroach</b>	<b>Oriental cockroach</b>
<ul style="list-style-type: none"><li>➤ a.k.a. “palmetto bugs” or “water bugs”</li><li>➤ Large (1-1/2"); brown color</li><li>➤ Glides in the air</li><li>➤ Lives in sewers and basements</li><li>➤ Likes it hot</li></ul>	<ul style="list-style-type: none"><li>➤ a.k.a “water bugs”</li><li>➤ Large (1"); black color</li><li>➤ Lives in sewers, basements, and mulch</li><li>➤ Likes it cool</li></ul>
 A photograph showing several American cockroaches of various sizes, including adults and nymphs, against a light blue background. The insects are reddish-brown with long antennae and legs.	 A photograph showing several Oriental cockroaches of various sizes, including adults and nymphs, against a light blue background. The insects are dark brown to black with long antennae and legs.

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American: Warm and wet. In a damp basement behind a water heater would be an ideal place to look for them. They are not as big a challenge as German cockroaches because their populations don't grow as fast. Unlike German cockroaches, they will stick their eggs to objects near where the living conditions (for a cockroach) are good. Placing the egg case outside makes the eggs susceptible to environmental conditions that could kill them before they hatch.

Oriental: These pests are less of a problem than German or American. They are large, flightless, and like it cooler. They tend to come inside when outside areas get dry and they need water.



This growth curve is for a German cockroach. A population can get out of hand very quickly. Calculations are based on 40 eggs per case (20 male, 20 female), one month for eggs to develop, one month after hatching they can reproduce. Females develop one egg case a month. The graph assumes no death due to environmental factors and a 1:1 male to female ratio which are unrealistic, but the potential for population growth is a fact, with or without environmental influences.

*Use this graph and the asthma connection to make the argument that no number of cockroaches should be tolerated. One can become a lot very quickly. The best way to stop an infestation early is to have sticky trap monitors placed under the sink, behind the refrigerator, and in the bathroom. Monitors can alert you to a new (e.g., from a store or neighbor), or a growing infestation before cockroaches or their frass is seen.*

## Signs of cockroaches

- ✎ Live cockroaches
- ✎ Dead cockroaches and their parts
- ✎ Frass
- ✎ Egg cases

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*IPM doesn't only deal with the adults that are seen moving around. Cockroaches spend most of their time hiding. Nymphs and pregnant females don't travel much at all. To know about cockroaches, trainees need to know all the evidence of their presence. They may only smell them or see frass. If a live cockroach is seen, it usually means that a good hiding area was disturbed or that the infestation is severe.*



Left: American cockroaches.

Right: German cockroaches (note the presence in a cardboard box). *Note that cardboard and paper bags should be recycled or thrown away immediately after being emptied because they may have cockroach eggs from a distribution facility, they offer great hiding spots, and the glue can feed the cockroaches.*

## Dead cockroaches



**German cockroaches  
on a sticky trap**



**Brown banded  
cockroaches  
by a door hinge**

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Left: Sticky trap with German cockroach adults and nymphs (*mention that the sticky trap is a tool you will show them*). The presence of so many nymphs on the trap indicates it may have been placed near a good cockroach hiding spot. It is important to note where traps are placed so that patterns like this can be seen and area can be treated accordingly.

Right: Brown banded cockroaches that have been squished when the door closed.



Frass along the top of a door, under a shelf, and on a wall where a clock was hung (*note that when the clock was there the place looked clean...trainees have to know where to look to find signs*).

*Suggestion: use the clock as a review of the kinds of cockroaches. The kind that infested behind the clock were Brown Banded (high and dry).*

## Where cockroaches live

- ✦ Anywhere in a building
- ✦ Prefer spots near water but also need food and warmth
- ✦ In cracks and crevices where their bodies touch surfaces above and below



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Department of Entomology

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Trainees have to know where to look for cockroaches because they are most active at night and most will be hiding at any time. Cockroaches love appliances that have water associated with them.

*Suggestion: Have trainees reason that the kitchen is the most likely place (food and warmth from the stove, refrigerator, and under the sink); the bathroom is second because of water. Cockroaches can be found in other rooms as well. Inspection should be done in all rooms (even bedrooms, living rooms), especially when the infestation is bad. If cockroach signs are found in the unit, bait should be placed in all rooms. Take this opportunity to get the trainees to think like a pest and decide where they would want to live.*

## What cockroaches eat

- Crumbs
- Grease
- Trash
- Cardboard glue
- Just about anything



**Under the bag in a trash can**

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Cockroaches will survive on most anything.

One drop of grease will feed 20 cockroaches for a day...cleaning is important in cockroach control!



## Where cockroaches drink

- Sinks
- Counters
- Floors
- Pet bowls
- Shower stalls
- Sweaty pipes
- Refrigerator drip pans and gaskets
- AC units



**Sources of water  
in a kitchen**

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Cockroaches can live a month without food, but survive only a week without water...removing water sources is important!

## Think like a cockroach

We think of a building as rooms, hallways and stairwells

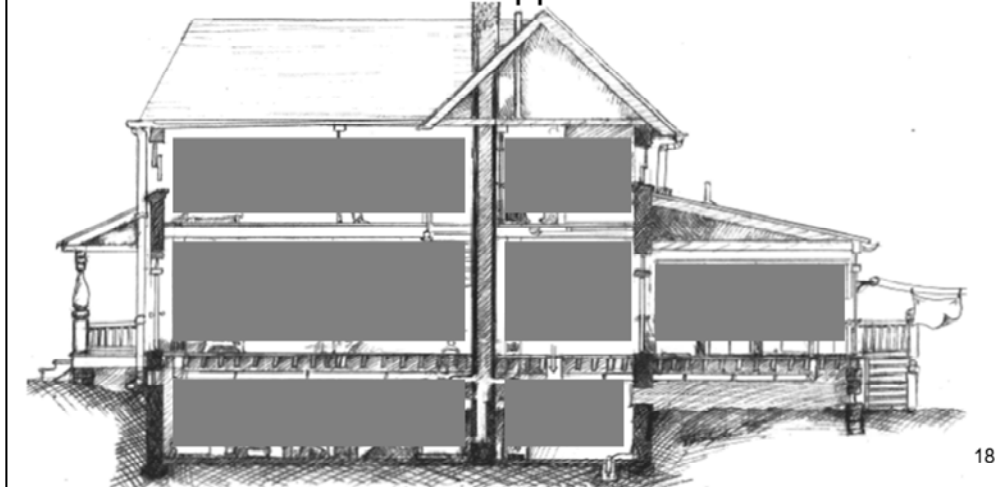


Trainees should go about looking for cockroach signs by thinking like a cockroach.

Most people think of a building in terms of its rooms. Often, the areas of the building that are blocked off here are ignored.

## Think like a cockroach

To a cockroach, a building is the spaces between walls and around and in appliances



Food and water have been discussed, this slide gets trainees thinking about where cockroaches hide. To know where to look for cockroach hiding spots, trainees must think like a cockroach. Cockroaches live in the building, but they don't see the building the same way we do. To them, any crack or hole is a door and in-between walls and floors is the safest place to travel and hide: a cockroach freeway.

*Maintenance repairs will disrupt cockroach travel and hiding, making them easy to find and kill. The repairs also benefit the building.*

*In addition to making repairs that prevent future cockroaches, trainees should be taught to clean up after the ones that were present by vacuuming using a HEPA vacuum and scrubbing the frass with soap and water.*

*Use the training space as an example. Is there a drop ceiling? This is like a pest superhighway. What's behind the electrical outlet?*

*Suggestion: Have trainees brainstorm areas where cockroaches might hide.*

*Macro-thinking: Kitchen, bathroom, boiler room, trash chute, dumpster*

*Micro-thinking: Toaster, oven, under the stove's top cover housing the burners, behind/under the refrigerator, in the crevice where the stove joins the counter top, under the*

*sink on the back side of the front center panel and all four corners of the interior of where the sink “sits” in its counter hold frame, behind any loose-fitting escutcheon plate beneath the sink; under the trash can*

## IPM practice

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



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Observations: Dog food and water left out. Dirty dishes are left in the sink to soak overnight.

*Trainees should now apply what they've learned.*

*Trainees should suggest that cleaning and drying dishes nightly and picking up pet food at night will go a long way to control the pest at no cost to the property.*

This example shows how knowledge of the pest along with awareness of the environment and a simple change in practices can result in pest management.

*Suggestion: Discuss the use of a pan under pet food and water dishes. This makes it easier to pick up spills from a sloppy eater and may restrict some pests from feeding.*

## Cockroach common areas: refrigerators and stoves

- Daily: wipe grease and crumbs from the stove top
- Weekly: Detailed cleaning of stove top—remove burners and wash drip pans
- Quarterly:
  - pull appliances away from the wall and clean the floor underneath,
  - clean under the stove top,
  - clean or replace the stove vent filter, and
  - wipe down refrigerator gaskets

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Doing the dishes and picking up pet food should be part of a daily housekeeping routine. Keeping the stove and refrigerator appliances and areas clean is more time consuming than doing dishes, but it is more critical to managing cockroaches.

When residents move in, demonstrate how to access all cleanable areas of these appliances. At a minimum show the resident how to remove the burners, drip pans, and lift the stovetop up (if the stove has this feature). If management prefers a maintenance technician be the one who pulls the refrigerator or stove away from the wall, encourage the resident to arrange this service at least once every quarter.

## Disassembled stove

Take a stove apart for cleaning



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*Ask attendees to raise their hand if they have taught this skill to a resident, family member, or friend.*

## Got cockroaches? Now what?

There is not just one answer

- First find out:
  - What kind?
  - How many?
  - Where?
- Then use solutions that provide:
  - Most effective prevention and control
  - Least risk to residents and staff

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IPM is tailored to each situation. Practitioners use specific information to make the best decisions about control.

What kind of cockroach? It is useful to know which of the cockroach species is present, because the plan for control should match their life cycles and habits.

How many? Is this just a beginning infestation, with only a few cockroaches, or a full blown, long-term infestation? The former situation can most likely be handled relatively easily, with fewest interventions. The latter will require everyone's cooperation to the fullest. Investing time to inspect early will help put together an effective and efficient action plan.

Where? Cockroach "hot spots" can be given most attention and may be the source of the whole population. *Reference the macro-thinking brainstorm (boiler rooms, trash chutes, or a particularly infested unit). If the most infested units are identified and focused on, the building's cockroach problem should be controlled. Identifying focus units through inspection should be one of the first steps in an IPM program.*

It is also important to record vulnerable or sensitive populations and situations: infants and children, the elderly, pregnant women, and people with chemical sensitivities. Inhabited units will each require a specific plan. Vacant apartments allow more in-depth control to take place, but attempts should still be made to minimize the pesticide residues that might be left behind.



## Inspect

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



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To inspect effectively, trainees must know to look in areas where cockroaches are living. They should look where cockroaches might hide for the previously discussed signs of cockroaches. *A reporting system is crucial so the PMP will know where to apply pesticides (and where NOT to apply), the staff will be aware of units having sanitation issues, and all will know if any units are occupied by vulnerable or sensitive populations.* If cockroaches are being reported in clean units, trainees should know to check the adjacent units because they may be generating a cockroach population.

*Children are often the best inspectors. If there are kids in an area, they should be asked if they have seen the target pest. They may know the source.*



Cockroaches are active at night when people aren't looking and they hide where people don't usually look. Monitors help find cockroaches when and where people can't.

*Show a sticky trap.*

A common way to monitor for cockroaches is to use sticky traps. Sticky mineral-based glue is put on paper. There is no pesticide.

The paper is folded to keep out other pests out (and the curious cat). In this type, the paper is folded into a triangle. It has glue in small places on the outside to keep it in place. *The key is to properly place the trap in a corner or near a water source.*

A few things to note about the pictures:

1. The traps with cockroaches were in the kitchen and bathroom. The kitchen was worse. The other traps were in the bedroom.
2. The small cockroaches (nymphs) in the lower left photo indicate that the trap was close to where cockroaches were thriving. Adult male German cockroaches travel about 12 feet to find what they need to survive, adult females go about 6 feet, nymphs usually stay within a foot of the place where they find food, water, and shelter.
3. The tongs in the background allow one to avoid touching the cockroaches on the traps.
4. The cockroaches can survive for several weeks on the glue trap.

*Sticky traps are information-gathering tools. They alert to a growing infestation in common areas, such as trash chutes and trash storage areas. To see changes that indicate a growing population, the sticky traps must be checked and changed periodically. Suggest writing a date and specific location (e.g. Unit 315 Bathroom) on them when placing so that patterns and the time it took to catch the number of cockroaches will be known. The concept of an IPM log will be introduced in the IPM and Pesticide Use section, but take this opportunity to demonstrate how keeping records of trap counts could tell a lot about the problem.*

Traps that are covered, like the three on the left, above, should be put in a re-sealable bag and brought to the property manager or designated person who will assess the information.

*Hand out sticky traps and have trainees put them together. Ask trainees to brainstorm areas*

*where sticky traps should be placed. Note that this will be practiced later.*

## Prevention and control: Sanitation

- Good, detailed sanitation makes pest control work
- Eliminate hiding spots, food, and water available at night by
  - cleaning the kitchen
  - reducing clutter
  - throwing away dead cockroaches
  - cleaning frass and areas where there were cockroaches with simple soap and water



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"Detailed sanitation" includes all crevices and spaces around and beneath stoves, refrigerators, dishwasher, etc.

By "simple soap" we mean non-smelly cleaning products. It doesn't take much to break the molecules that trigger asthma, but water alone won't be effective. Strong chemicals will contaminate nearby baits (discussed later). It's important to remove the frass, since that is the asthma trigger, but not reduce the efficacy of other control tools.

Reference: [www.epa.gov/epp/pubs/products/cleaning.htm](http://www.epa.gov/epp/pubs/products/cleaning.htm) for more information on appropriate cleaning products.

## Prevention and control: Exclusion

Seal or fix cracks, peeled wallpaper and shelf liners, or holes that cockroaches could get through  
Use

- silicone caulk
- copper mesh
- screens
- door sweeps—  
always on  
boiler rooms and exterior doors



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The left picture shows a wallpapered wall in a bathroom that needs repair work. It's harboring cockroaches. Making these types of repairs is good for the building and good for pest control. The photo on the right is a crack in the plaster that could be hiding cockroaches. *Show and tell the exclusion tools listed, then encourage a discussion about caulk.* Although most expensive, silicone caulk will provide the longest lasting control since it adheres to surfaces and holds through the inevitable slight shifting of buildings.

Weatherstripping is not pest-proofing. Door sweeps are essential on doors leading to the outside.

Young cockroaches want a crevice as thin as a dime. Adult males want a space the thickness of a quarter. Pregnant females want the most space of all to hide: two stacked nickels. All like to be squeezed.

Reference: How to Control Pests Safely pp. 6-7

Reference: Bobby Corrigan's Sealant vs. Caulk Comparison

## Prevention and control: Targeted chemical use

- Sanitation first!
- Maintenance staff and residents should not spray. Spraying should be a last resort and done only by a PMP
- Read the ENTIRE pesticide label before buying, using, storing, or disposing of a product
- The label is the law!
- Follow the label directions closely


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After this slide will be three pesticide options for cockroaches that can be used to complement other IPM practices.


Pesticides may not be an option if an individual has chemical sensitivities; in that case sanitation, sticky traps, and exclusion will need to be the IPM plan.

**Prevention and control: Baits**

- The most effective pesticide option
- Won't work if contaminated by strong-smelling cleaners or other chemicals, pesticide sprays or foggers, or nicotine from cigarette smoke
- Use in every room where inspection finds evidence



**Gel Bait**



**Bait Station**

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Baits are the most common and effective pesticide for cockroaches nationwide.

Baits and gels rely on roaches wanting to eat them. If baits are contaminated with chemicals that the cockroaches recognize as poison, cockroaches will avoid them. This is often why residents say that baits “don’t work.” They won’t if the resident is also applying aerosol cockroach killers in the same room. Strong-smelling cleaners can have the same effect. Nicotine from smoking will also contaminate the bait. This is one reason why gloves should be worn when placing bait. When cleaning out cabinets before putting in bait stations, strong-smelling cleaners should not be used. Regular soap and water is effective and won’t ruin the bait’s effectiveness.

The photos above are of two common methods of delivering baits. The photo on the right shows a bait station. The photo on the left shows the same pesticide in gel form. Small dots (about the size of a pea) of this gel are put into cracks, crevices, and corners where there is frass. It works the same as the bait station but more care must be used to keep it away from curious children. It should be used only in cracks and crevices to keep children from getting at it. When re-applying, old bait should be removed. *It lasts about three months—less time than bait stations since it is more exposed to the air.* When it dries out, the cockroaches will not be attracted to it.

*Note that bait storage is also a concern. If baits are stored with herbicides or cleaning products, they may become contaminated and ineffective.* This holds true for rodent baits (which will be discussed later).

*Suggestion: Pass out bait station.*

Reference: See [www.epa.gov/epp/pubs/products/cleaning.htm](http://www.epa.gov/epp/pubs/products/cleaning.htm) for more information on appropriate cleaning products.

## Prevention and control: Baits

- The bait needs to be the only food in the area—sanitation first!
- Slow to kill: Cockroaches feed on the bait and take it back to their hiding spots where other cockroaches live



**PMP's gel bait applied under a drawer** 29

Cockroaches eat the pesticide, and go back to where they like to hide. They die slowly. Other cockroaches feed on the dying cockroach's frass and body and they get poisoned too. *Some people don't trust them because they do not see dead cockroaches. Reassure residents that baits take a little longer to kill cockroaches than conventional sprays or aerosols, but are effective. Sometimes the baits consist of insect growth regulators (IGRs). These products interfere with the cockroach's ability to grow and reproduce. IGRs are slow acting but very effective.*

The see-through cover allows the user to see the pesticide in the bait station and tell if the cockroaches have been feeding. The pesticide is the white or brown material in the center. *If the bait isn't being eaten, trainees should first check for other food sources in the area (sanitation first!). If the cockroaches have not fed on the bait after a few days, they should place it in a different area. If that doesn't work, try a different kind of bait.* Bait stations are popular because there is very little risk of pesticide exposure and the container is tamper-resistant. It lasts about three to six months depending on conditions (including how many cockroaches are eating the bait).

*Sometimes cockroaches learn to avoid a type of bait. If cockroaches stop feeding on the bait, try a new type of bait. It is not a bad idea to rotate baits (choose a bait with a different active ingredient) every 6 months or year.*

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Reference: How to Control Pests Safely, pp. 10-11.

Reference: Cincy Cockroach Study



## Prevention and control: Insecticidal dusts

- ✦ Least toxic active ingredients you may know:
  - boric acid
  - diatomaceous earth
- ✦ How they kill cockroaches:
  - A stomach poison
  - Dry them out
  - Contact kill
- ✦ Long-lasting if dry

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Insecticidal dusts will kill insects in one of three ways, depending on the active ingredient. Dusts that contain boric acid act as stomach poisons. The cockroach walks through the dust and ingests the poison when cleaning itself. Other dusts like boric acid contain silica, which is like tiny shards of glass. It affects the cockroach's outer layer so that they can't retain enough water to stay alive. Many PMPs use dusts with active ingredients in addition to the silica for faster kill.

*Insecticidal dusts can be put in the wall void before replacing the faceplates of electrical outlets. If using metal-tipped bulbs, care should be taken around electrical sockets.*

*Suggestion: Avoid bias. Give trainees the facts about each product and let them discuss and draw conclusions for themselves.*

## Prevention and control: Insecticidal dusts

- Effective if used correctly
- Light dusting—never piles
- Use in walls before fixing them if infestation exists
- Unit location may justify application under and behind cabinets at turnover or when making large repairs...  
but clean first!



**Incorrect use of insecticidal dust**

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If the dust can be seen, there's too much or it's in the wrong place. If there is a pile, the cockroach will avoid it. *Have trainees think of a pile of snow versus a shoveled path. Which would they walk through?*

*Because insecticidal dusts can become airborne easily, a respirator should be worn while applying them and ventilation systems should be turned off.*

*As always, documentation is key. If an inspector finds a white powder in a unit, a record of what it is and where it was applied should be available so that a narcotics or Hazmat crew is not needed.*

Reference: How to Control Pests Safely page 10

## Prevention and control: Insect growth regulators (IGRs)

- Interfere with cockroach growth and egg hatching
- In sprays, aerosols, and impregnated discs
- Take a month to work
- Stay effective for a long time
- Compatible with other IPM methods; may enhance baits

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Before approving conventional sprays, IPM Coordinators should consider insect growth regulators. Communication between the PMP and the resident will also help the resident understand the service and address pesticide concerns, vulnerabilities, or sensitivities. The goal is to have everyone understand why conventional pesticide sprays are not to be used. Insect growth regulators (IGRs) may be sprayed in cracks and crevices by PMPs using a spray application by a PMP. *The PMP may explain, "I am applying a pesticide that makes it so that the cockroaches can't grow up properly. It's called an insect growth regulator and it is a pesticide that poses less risk to you and your family than the sprays you may have seen before. Don't expect to see dead cockroaches right away. IGRs take a few weeks to work."*

IGRs can be a good choice when transitioning to an IPM program. IGRs help prevent reinfestation. They prevent cockroaches from maturing, so they cannot reproduce. IGRs are slow-acting (it will take at least two weeks to see a change), but they are a good option when used with bait and dusts. Most stay active for 90 days.

Using IGRs for German cockroaches may promote cockroaches feeding more heavily on bait until they die. PMPs should not spray them directly over the bait.

## A review of IPM tools

- Sanitation
- Exclusion
- Pesticides:
  - Baits
  - Insecticidal dusts
  - IGRs

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*Suggestion: Have the trainees brainstorm specific tools and which category they belong to. Plastic bags, chip clips, vinegar, soap, sponge, towel, dish drying rack, vinegar, pipe insulation, and gloves are all potential suggestions.*

## Don't use over-the-counter sprays and foggers

- ✦ Over-the-counter sprays and foggers are not part of IPM in multifamily housing
- ✦ They are not compatible with baits
- ✦ Cockroaches develop resistance



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*There are more effective products than over the counter sprays and foggers that pose less risk and get at the source of the pest problem.*

Sprays and foggers—whether in a pump-up sprayer or pressurized can—deliver pesticides to kill cockroaches. In general, these pesticides repel the cockroaches or kill them on contact. Some items to note:

1. Repelling cockroaches may only chase cockroaches to another unit. Furthermore, it is difficult to reach cockroaches with sprays. As a result, the sprays do not usually get the hiding cockroaches and have limited duration. The quick—and sometimes—visible kill does not last.
2. The sprays may contaminate the baits, rendering them useless. If the bait is contaminated, the cockroach will not go in the bait station to feed.
3. The spray or fogger may result in pesticide exposure to people. Given the effectiveness of baits, this exposure and the health risks may be unnecessary.

Generally PMPs should not be using sprays to kill cockroaches even though many still rely on it—partly because they think the customer expects to see it. There is no need to broadcast spray for cockroaches if IPM is being used.

*If sprays must be used as a spot treatment in specific areas, premixed are less risky to use than concentrates that must be diluted. Errors in measurement or dilution are avoided and the chance of spills and accidental exposure is reduced. Premixes are available in gallon containers that often include trigger sprayers or may be poured into pressure sprayers. These sprays may be applied only by licensed PMPs.*



*After questions are answered or written in the parking lot, give trainees a break.  
To keep the day running smoothly, tell them how long the break is and exactly what time they should be back to the training space.*