

(A. Sheffield)

Figure 4-1. Cockroaches are easily transported from infested dwellings to new places

## Chapter 4

# Locate Problem Areas

### How Did I Get Them?

Cockroaches are easily transported from infested dwellings to new places. The cockroaches you have may have “come with the house or apartment,” or you may have brought them with you from the last place you lived. Maybe you brought a gravid (pregnant) German or brownbanded cockroach (or an egg case) home in a grocery bag or in a cardboard box. If you work in a cockroach-infested building, you could easily transport them home if you take anything home with you. Oriental cockroaches can often crawl under the door or enter through cracks in the foundation. Repairs on the sewer system may result in displaced American cockroaches coming into buildings.

Cockroaches also move easily from one apartment to another. It is common for apartment tenants to blame their neighbors for their cockroaches, and in some cases, they may be justified. If a cockroach population in one unit gets large, cockroaches will migrate into nearby units for food and new places to live. Other factors can also cause cockroaches to move. Insecticide treatments may trigger movement to nearby apartments. If the neighbor moves out and the unit is empty, cockroaches will move to find water and food.

Because cockroaches are so easily transported, it is hard to **NOT** move them to your next residence if you move. Cockroaches can live in the little spaces of corrugated cardboard, so just moving boxes can transport them with you. One suggestion is to unpack boxes outdoors or in a garage. Or, use plastic tubs instead of boxes to transport your belongings in.

### Where Are They Living?

The first step is to assess the situation. Inspecting and monitoring are important parts of any pest control strategy. By locating the cockroach infestation first, your controls can be more economical, more effective and less time

consuming. The first and most obvious way of detecting live cockroaches is with a visual “night watch”—observing live cockroaches when the lights are turned on unexpectedly. Another method is to examine suspected areas with a flashlight.

In the course of your inspection, you will be looking for live cockroaches, dead cockroaches, cast skins or cockroach parts. Also look for empty or intact egg cases and roach specks or fecal smears (Figure 3-9 and Figure 4-2). The inspection will help you identify the cockroach, where the infestation is located, the size of the infestation and conditions favoring cockroach survival.



(B. Ogg)

Figure 4-2. German cockroaches and fecal specks on the door frame, under a calendar.

### Inspection Equipment

Proper equipment is essential for conducting an inspection. For inspecting your home or apartment, the following three items are recommended:

1. A flashlight to illuminate dark areas where cockroaches like to hide.
2. A mirror with extension arm (such as a dentist’s) to help see hidden areas, like behind sinks, under refrigerators and appliances.
3. Monitoring traps.

## The Inspection

**Visual Examination.** We will use the inspection of a home or apartment for German cockroaches as an example of how to carry out any cockroach inspection. The principles will be similar for brown-banded, oriental and American cockroaches.

It will be helpful to get answers for the following questions. Where did you first see cockroaches? Where do you see them now? Ask others living in the home the same questions.

Consider past or present professional pest control efforts in your home. If the previous pest control tactics included the use of insecticides with a strong repellent effect (this includes most of those currently used today), the cockroach infestation may have moved from its original location. In this case, you should spend some time exploring locations where insecticides were not used, like false ceilings and other areas above your head.

Before beginning a detailed examination of the area, take an overall look at the premises, inside and outside. Build a picture of traffic patterns for people. In particular, where is food brought in? Where is it prepared? Where is it eaten? How are leftovers and other garbage disposed of? Is the trash emptied in a timely manner? Perhaps the cockroaches hitchhiked into the kitchen with food supplies. Consider food storage and related activities, such as recycling bins and cardboard boxes. Could these be encouraging the problem? If introduction with food is confirmed, try to identify where the cockroaches originally came from.

Could cockroaches have been brought into the residence by someone who works in infested buildings? Are there college kids who frequently move between apartments and home? These are easy ways to move cockroaches into residences from infested buildings.

In apartments, the cockroaches may have first entered from outside or from adjoining units. You should check possible entry points such as around water and drain pipes under the sinks, sewer pipes,



Figure 4-3. A single slice of pizza, left on the counter overnight is a feast for cockroaches.

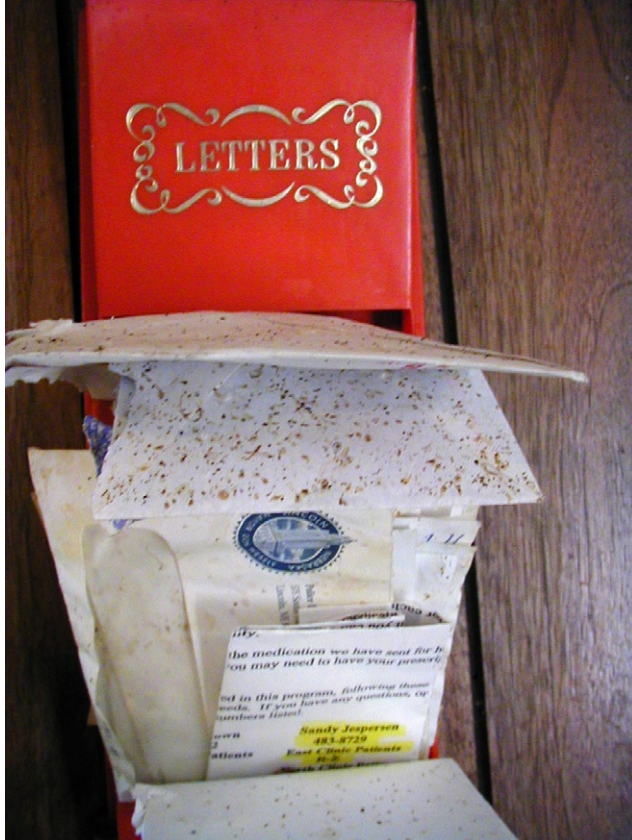
steam supply pipes, conduits for electricity or crevices in walls connecting with other infested areas. Identifying the origin of the cockroaches is valuable from the long-term viewpoint to prevent reinfestation.

***German cockroaches like warm, dark locations near food and water.***

It is helpful to note all those factors favoring German cockroach survival once they have gotten into your home. Since cockroaches need food, look for food sources, such as fresh fruits or vegetables and pet foods. Also, look for food spills or buildup of food material in or under counter tops, stoves and refrigerators. Look in mops and brooms, inside the rims of the floor drain, around the wheels of mobile carts and other similar places. You should also check less obvious food sources, like rodent bait stations, for signs of cockroach activity. Cockroaches aren't killed by rodent baits.

Cockroaches need water as well as food, so check for condensation or leaks providing a water source. Don't forget to consider less obvious sources of water such as planters, pet water dishes and fish tanks.

In addition to food and water, cockroaches need daytime hiding places in which to rest and breed,



(B. Ogg)

Figure 4-4. Cockroach droppings in stacks of mail in letter holder.

and these harborages must be identified during the inspection. Once again, use your knowledge of the target pest to focus your efforts. German cockroaches prefer dark crevices close to moisture. They like bare wooden surfaces, cardboard or paper because these surfaces are easier to climb and because porous surfaces retains their aggregation pheromone. They will also be found in stacks of paper, grocery bags, letters and other paper items (Figure 4-4). Pay particular attention to fixtures made of wood, such as storage shelves, wooden tables and cabinets. Also check behind and under appliances, in the corners of rooms at floor or ceiling level, behind pictures and around the legs or wheels of carts as well as in appliance voids. Don't forget to inspect suspended ceilings.

Sometimes cockroaches become trapped in such things as spider webs, light fittings and partially empty beverage bottles. Look for every clue you can when identifying the problems.

In general, the harder it is to gain access to a potential harborage, the more likely it is to be infested.



(V. Jedlicka)

Figure 4-5. Cockroaches in the tight space of a door jam.

**Trap Placement.** It is now time to use traps to give you a better picture of the size and location of the cockroach infestation. We suggest sticky traps because they are easy to buy and use. Both baited and unbaited sticky traps are available. Baited sticky traps are impregnated with aggregation pheromone and may catch more cockroaches, but



(C. Ogg)

Figure 4-6. Place sticky traps near where you have seen cockroaches or near moisture or food sources.

unbaited ones will work well to locate infestations. Banana extract is another substance attractive to cockroaches. To make your own baited traps, add a few drops of banana extract to the center of the trap.

Make sure to use the same type of traps to make your comparisons valid. Before you position each trap, label the trap so later you will be able to tell where and when it was placed. Place traps near cracks and crevices, moisture or food sources or where you've seen evidence of cockroaches. Dark corners are good locations.

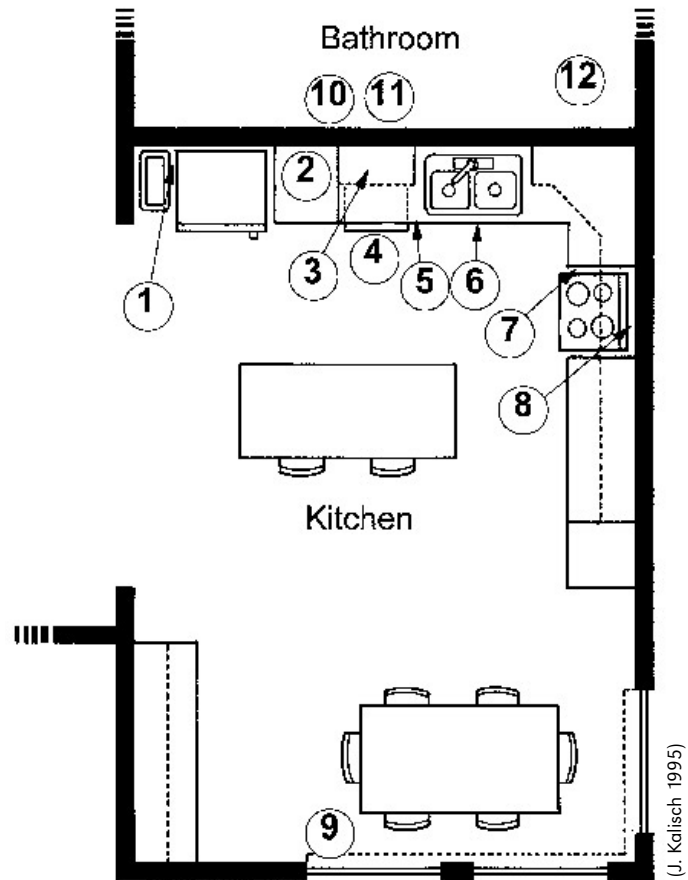
The number of traps you'll need depends upon the extent of the infestation. The more infested locations, the more traps will be needed. Keep in mind you will only catch cockroaches when traps are placed within five to six feet of infested areas, and the closer the trap is to the infested area, the more cockroaches you will catch. When placing traps, consider all possible areas from floor to ceiling. If traps don't catch any cockroaches, move them.

In addition to putting traps in known infestation areas, you must also place enough traps to "cover" the areas of suspected infestation (with German cockroaches this means the kitchen and bathrooms). To accomplish this, first put at least one trap in each of the following locations:

- 1) beside or behind the toilet,
- 2) under the sink in the bathroom,
- 3) beside the shower or bathtub,
- 4) under the kitchen sink,
- 5) behind, under or beside the refrigerator,
- 6) beside, under or behind the stove,
- 7) in the back of each kitchen cabinet,
- 8) beside or under the water heater (if available),
- 9) behind or beside the washing machine,
- 10) behind or beside the automatic dishwasher.

#### Placing Traps in A Hypothetical Kitchen.

This diagram of a kitchen shows suggested places for traps. In this kitchen, we placed more traps than the essential trap placements already discussed. You can never go wrong by using more traps which may give you more information about the infestation to help in your control efforts.



(J. Kalisch 1995)

Figure 4-7. Diagram of trap placements for a hypothetical cockroach infestation.

**Calculating Cockroach Densities.** The length of time you should leave the traps depends on the infestation level. With high infestations, traps may be completely filled overnight. Smaller infestations may require several days to a week or more to catch a significant number of cockroaches. If the sticky trap surface becomes completely covered with roaches, the trap should be removed and replaced because it is no longer effective.

After you get a significant trap catch, record the dates the traps were set out and the collection date on the trap worksheet. Next, check each trap, record the type of cockroaches you have caught and count the total number of cockroaches on each trap. Add counts from each trap to give a grand total. Divide the grand total by the number of traps you used. Divide this number by the number of nights the traps were out. This number is the average number of cockroaches caught per trap per

night. This number can be used to provide a rough estimate of the size of your cockroach population. Refer to Table 1 to determine what your trap count represents. These numbers are relative. For some people, high number of German cockroaches may only be two or three per trap per night. For others, 10-20 cockroaches per trap per night would be considered low.

What can you learn from sticky trap data? First, you should be able to identify the cockroach species.

Second, comparing trap catches will tell you where infestations are located. You can also get an idea of the size of the cockroach population.

**Continue Monitoring.** Even after you have begun control efforts, continue to use sticky traps in the same locations so you can compare populations over time. As before, calculate the number of roaches/trap/night. Doing this will let you evaluate your success.

Table 1. Relative numbers of the four domestic cockroaches placed into low, moderate, high and extremely high categories. These numbers are cockroaches captured per trap each night.

Infestation	German	Brown-banded	Oriental	American
Low	0-5	0-3	0-1	0-1
Moderate	5-20	3-10	1-10	1-10
High	20-100	10-50	10-25	10-25
Very High	100+	50+	25+	25+

## Hypothetical Cockroach Trap Worksheet

**Cockroach Species:** German  
**Date Installed:** September 10  
**Date removed:** September 11  
**Trap Nights:** 1

Trap No.	Location	Total Cockroaches Captures
1	beside refrigerator, against back wall, beside trash can	20
2	pantry shelf, against back wall	21
3	upper cupboard (above dishwasher), against back wall	12
4	front of dishwasher, next to toe-plate	6
5	lower cupboard, against side wall next to dishwasher	9
6	under sink, against back wall, centered under pipes	35
7	against side wall beside stove	6
8	under and behind stove, against back wall	26
9	against wall near heater penetration	4
10	under bathroom sink in vanity, against back wall, centered under pipes	7
11	behind toilet, near water pipe penetration, against wall	2
12	beside shower in bathroom, against wall	0
13	under water heater in basement	0*
14	against wall, near floor drain in basement	0

**Notes:**

\* Trap #13 had a wolf spider in it.

**Grand Total:** 148

**Total #/trap/night:** 10.6

In our hypothetical example, you should note several things. First, the cockroach population is centered in the kitchen, in the areas under the sink, refrigerator/trash can, pantry area and near the stove. There is also a smaller infestation in the bathroom, but no infestation is found in the basement. If the traps in the basement continue to be empty after about a week, they can probably be ignored and need not be replaced.

## Cockroach Trap Worksheet

**Cockroach Species:** \_\_\_\_\_  
**Date Installed:** \_\_\_\_\_  
**Date removed:** \_\_\_\_\_  
**Trap Nights:** \_\_\_\_\_

Trap No.	Location	Total Cockroaches Captures
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

**Notes:**

**Grand Total:** \_\_\_\_\_

**Total #/trap/night:** \_\_\_\_\_