

# GERMAN COCKROACH POPULATION MONITORING...

HOW DO I DO IT AND WHY SHOULD I BOTHER?

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**T**he use of cockroach traps alone to significantly reduce German cockroach (*Blattella germanica* (L.)) populations in infested housing units has not been an effective control strategy [5,6,8,22,24,27]. However, the use of traps to monitor cockroach populations is well documented (1,3,4,9,15,20,23,26). In this study three cockroach population monitoring approaches were evaluated including sticky traps, bottle traps and visual inspections. Each of these strategies differed in terms of cost, ease of use and effectiveness.

trap and an adjacent test trap. None of the traps used in the study were baited. Baits were not found to be an important variable in the catch size of German cockroaches (5).

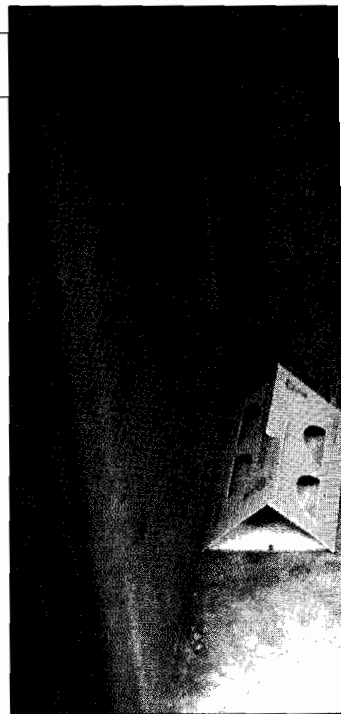
Mr. Sticky traps (whole or half) were used throughout the research project unless otherwise indicated. Mr. Sticky is distributed by Brody Enterprises in New Jersey, LTP Inc. in New York and several other suppliers. Traps were placed in each home at the following locations: under the kitchen sink, adjacent to the stove or refrigerator, behind the toilet in each bath-

room and adjacent to the furnace in homes with a basement. Since laboratory studies [7] indicated that one quarter of a sticky trap was efficacious in catching German cockroaches in choice boxes, half of a sticky trap was included in these field tests. Half traps were easier to handle than quarter traps, and reduced the cost of monitoring.

Traps evaluated in the study included

whole Mr. Sticky traps (standard in every evaluation), which were compared to half traps, paper covered bottle traps with an interior petroleum jelly barrier, and double back carpet tape traps on plywood and on masonite. It was indicated by entomologist John Owens (19) that greater sensitivity in measuring cockroach population fluctuations occurred with increased numbers of traps. Therefore, extra pairs of standard traps were placed in closets

(Above) A typical trapping site for monitoring cockroach populations. (Top right) A variety of traps were evaluated in the study, including standard sticky traps, half traps and bottle traps. (Photographs courtesy of Dr. James Ballard)



## ADVANTAGES AND DISADVANTAGES OF COCKROACH MONITORING TOOLS

Tool	Cost	Flexible to Use	Trap Bulk	Monitor Time	Bother to Homeowner
Sticky Traps	Low But Constant + Continuous	Yes	Low	2 Visits	Low
Bottle Traps	Buy Once + Replacements	Yes	High	2 Visits	Low
Visual Counts	Flashlight + Flushing Agent	Yes	Low	1 Visit	Moderate

To determine which of the above methods could be practically used by the professional pest control industry as a business tool, they were field tested in German cockroach-infested housing.

**METHODS.** The study was conducted at a public housing site located in Macy, Neb. A paired trapping procedure was used in which each trap location within a home received both a standard Mr. Sticky™



to determine the utility of including closets as a trap location. Traps were held in the homes for one night. They were then removed and the mean number of cockroaches caught per trap per night was calculated. All traps were placed adjacent to a vertical surface (13).

A visual flashlight inspection was conducted during the day when cockroaches were in their harborage. Harborage sites inspected included:

- *Kitchen* — Under the left and right ends of the counter top (above drawers) and on all cabinet hinges.

- *Bathrooms* — Only medicine cabinet hinges were inspected.

The average number of cockroaches per inspected harborage was calculated for each home. Regardless of the trap or method used, at least 20 replications per monitoring method were used. Analysis of variance (2) was utilized to evaluate the data. Means were separated through the use of Duncan's Multiple Range Test (12).

**RESULTS.** When the standard traps from each trap pair were compared, no significant differences were found. Thus, all trap pairs were evaluated under similar cockroach population pressure. When the cockroach counts from test traps were compared (Table 1), no significant differences were found between standard, half or bottle traps, while tape traps and visual inspection resulted in significantly fewer cockroaches detected. The addition of extra trap locations (closets) neither significantly increased nor decreased the nightly trap catch of German cockroaches.

The large numbers of cockroaches caught provided an indication of the magnitude and dispersal of the population in the homes used in the study. Cockroach

populations of this magnitude may not normally be encountered in most pest control accounts. When the cockroach catch per square inch of sticky surface was compared, it was found that the half sticky trap caught twice as many cockroaches per square inch as the whole sticky trap (Table 2). The less tacky carpet tape traps caught few cockroaches in comparison to the standard traps. The influence of tackiness of the trap surface in terms of cockroach catch has already been investigated (17).

Of the locations inspected for cockroaches, 71 percent of the cockroaches counted were from under the counter top in the kitchen. When the average number of cockroaches found on cabinet door hinges under the sink was included (3.36), an average of 26.40 cockroaches were ob-

served under kitchen counter tops and hinges. This was not significantly different from the 24.80 cockroaches caught per trap per night under sinks. It appears that although the visual inspection method was less sensitive in monitoring cockroach populations, observations of cockroaches under countertops closely approximates trap catches under sinks (Table 3).

When trap location was considered, traps placed under the sink caught consistently fewer cockroaches than traps placed elsewhere in the kitchen, in bathrooms or in closets (Table 3). Perhaps reduced catch under sinks was due to greater probability of homeowner contact (usual location of trash container) and subsequent applications of over-the-counter insecticides.

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Trap/Count *, Catch/Trap	Number of Homes	Average
Additional Traps	27	35.50 a **
Standard Trap	23	34.19 a
Half Trap	23	33.08 a
Bottle Trap	20	21.76 ab
Tape (masonite) Trap	20	7.55 b
Tape (plywood) Trap	20	5.57 b
Visual Counts	22	3.48 b

\* No significant difference between any of the standard traps paired with above test traps, ANOVA, (2).  
 \*\* Means followed by the same letter were not significantly different (P=0.05), (12).

Table 1. Average number of German cockroaches caught per trap per night or counted per location inspected.

Trap Inch	Sq. Inch of Sticky Surface	Average Catch/Trap
Half	8.94	3.70
Standard	17.88	1.94
Tape (on masonite)	11.63	0.65
Tape (on plywood)	11.63	0.48

Table 2. Average number of German cockroaches caught per square inch of sticky surface per night.

Trap Location	Number of Homes	Average Catch/Trap
Under Sink	27	24.8
Stove or Refrigerator	25	66.9
Behind Toilet	27	43.6
Kitchen Closet	19	62.4
Hall Closet 1	21	40.3
Hall Closet 2	6	47.2

Table 3. Number of German cockroaches caught per trap sites.

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**DISCUSSION.** Many brands of sticky traps are available in the marketplace and range in price from \$0.07 to 0.47 per trap. The lower end of the price range is achieved by using the smaller traps or pieces of traps (from perforated traps). Reusable bottle traps with petroleum jelly barriers were inexpensive to use, while supermarkets sell sticky traps at a cost greater than the PCO distributor sells traps to the PCO.

Cockroach population monitoring creates the opportunity for the PCO to generate population data (cockroach counts on traps) which may be used to:

- Identify the insect pest(s) present.
- Document the impact of the treatment strategy used [i.e. actual numbers of cockroaches present].
- Identify where cockroaches are entering a periodically reinfested account (i.e. loading dock or customer eating area) [21].
- Identify areas in an account with cockroach activity to target insecticide application [14].
- Document effectiveness of control strategy in a general way (caught 30 cockroaches per trap when took over account and now only one cockroach per trap) [11,16].
- Bottle traps catch live cockroaches for research and resistance monitoring purposes [10].

The monitoring method of choice depends upon the specific business interest of the PCO. For instance, a PCO wishing a long-term business relationship with an apartment complex/authority may elect to use visual counts (i.e. under counter tops), which are low in sensitivity but rapidly performed (one visit). Sticky traps also may be used to identify which apartments need treatment and which do not [28]. Traps must be retrieved and cockroaches counted (two visits) on a regular basis. Alternatively, a PCO with a residential or restaurant account may elect to use several sticky or bottle traps to document cockroach activity, to measure progress in managing the pest population, to time an outdoor perimeter cockroach treatment

or to use counts to help hold the account from competitors.

Not all sticky traps catch the same number of cockroaches under the same conditions [18,25]. In any case, if you use sticky traps, stick to one brand, use several traps to reduce variation, leave traps out for the same number of nights (not days), and place the traps in the same locations in your accounts so that you can find them and for comparing trap catches through time [18]. In this study, unbaited bottle traps were less sensitive than sticky traps in terms of cockroach catch. It is possible that bottle traps, properly baited, may be equal to or even surpass sticky trap catches [Granovsky 1991, unpublished field research].

PCT

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### WHAT PCOs SHOULD TAKE AWAY FROM THIS STUDY

- German cockroach populations can and should be monitored to generate data for account maintenance.
- German cockroach populations can be monitored using any one of several easy and inexpensive methods.

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### WANT MORE INFO?

A number of articles about cockroach sticky traps have appeared in previous editions of *PCT* magazine. If you would like to receive copies of these articles, simply write: "Sticky Trap Articles," *PCT*, 4012 Bridge Ave., Cleveland, OH 44113. Requests also can be faxed to our office (216/961-0364).

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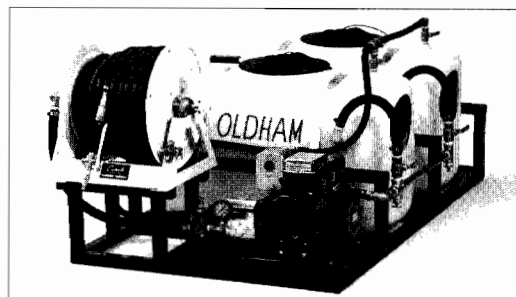
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