



Pest Control in Food Facilities

Identification, Mitigation, & Prevention

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Poll Everywhere

How are you feeling today?

- A. 😄 - excited
- B. 😴 - tired
- C. 😜 - goofy
- D. 🐜🐜🐜 - buggin'

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Pests and Food Establishments



Underlying issues allow for pest problems
Pests represent a health risk: contamination
Product loss, business loss, regulatory action

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Cockroaches & Public Health



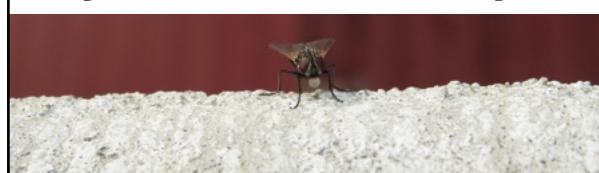
Mechanical vectors of pathogens
Asthma and allergy triggers
-feces and exoskeletons

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Flies & Public Health

Adult flies may cause contamination/irritation

- **mechanical transmission of bacteria**
- **salivary secretions and regurgitation**
- **defecate while feeding and resting**
- **allergic reactions to hairs & exoskeletons**
- **myiasis: invasion of human tissue by flies**



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Rodents & Public Health

BACTERIAL INFECTION CAUSED BY RAT URINE IN BRONX KILLS 1, SICKENS 2 OTHERS
February 2017



Salmonella viable in rodent droppings for 86 days

handling dead rodents can lead to infection

plague, typhus, hantavirus, allergies, tick-borne disease, febrile illness, food-borne illness, etc...

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Common Pests in Food Establishments

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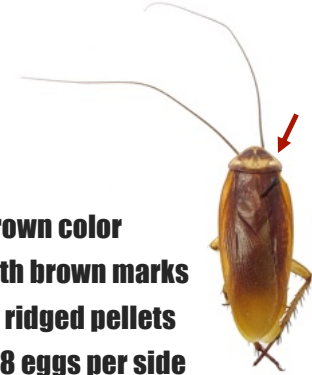
Every Pest Tells a Story

Knowing the pest can help you determine what conditions are present to support their populations.

A detailed inspection helps you find and address those conditions.

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American Cockroach



ID: 1.5 – 2", reddish-brown color
-pronotum yellow with brown marks
Feces: 1/8" blunt end, ridged pellets
Ootheca: 5/16 inch, 7-8 eggs per side

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German Cockroach

ID: 1/2" tan with 2 dark stripes on pronotum
Feces: black specks affixed near harborage
Ootheca: 1/3 inch, tan; 12-24 eggs per side



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Pest flies found inside a food facility could come from:

- A. Outside areas and enter through open windows, doors, etc.
- B. Introduced on incoming goods.
- C. An indoor breeding population.
- D. All of the above.

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Flies

Pest fly species develop in moist situations.

Species tells you what breeding conditions to look for.

Inspection helps you find the conditions.

University of Nebraska
<https://bit.ly/2GOpKfL>

Quick ID Guide to Small Filth Flies

There are several small flies (1/8 inch or smaller) that can become a problem under appropriate conditions near you. Each fly has special characteristics of its body and wings that distinguish it from another fly. Understanding each species and its preferred habitat, we can use an integrated approach to manage populations.

- Vinegar fly** (fruit fly): Dark brown, 1/8 inch long, common in moist areas. Larvae are cream-colored, 1/16 inch long, found in decaying organic matter.
- Scuttle fly**: Dark brown, 1/8 inch long, common in moist areas. Larvae are cream-colored, 1/16 inch long, found in decaying organic matter.
- Darkwinged fungus gnat**: Dark brown, 1/8 inch long, common in moist areas. Larvae are cream-colored, 1/16 inch long, found in decaying organic matter.
- Moth fly**: Dark brown, 1/8 inch long, common in moist areas. Larvae are cream-colored, 1/16 inch long, found in decaying organic matter.
- Lesser dung fly**: Dark brown, 1/8 inch long, common in moist areas. Larvae are cream-colored, 1/16 inch long, found in decaying organic matter.

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Flies

larvae (maggots)

pupae

adult

Larvae: eyeless, cream colored, mouth hooks, spiracles

Pupae cylindrical with circling lines from segments

Adults with two flight wings (one pair)

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effective pest management depends on accurate identification of pests

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House Mouse

contrast in fur color

seasonal activity

building access*

Peromyscus Mice

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Norway Rat

tall length | body size | ear size | snout shape

geography | nest site preference*

Roof Rat

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Inspection Tips and Insights

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Inspection Goals

An inspection should answer these questions:

- Are pests present and at what level?
- What factors are attracting pests?
- Where are pests living and hiding?
- How are pests getting in?
- What can be done to eliminate pest attraction, harborage and entry?

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Poll Everywhere

Pest evidence, especially poop, can hone your inspection to find harborage locations and movement pathways.

A. True
B. False

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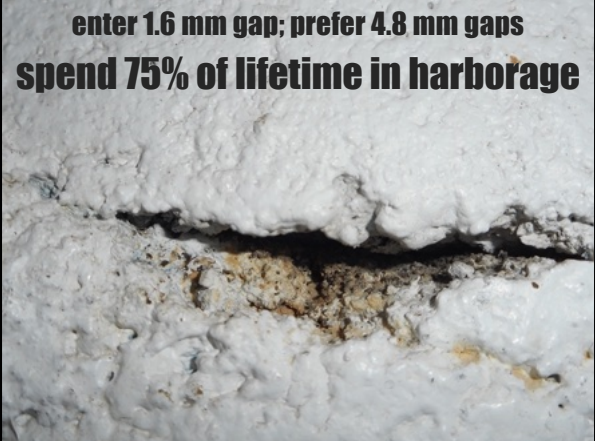
German Cockroach Inspections

“fecal focal points”
crevices near warmth and food



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enter 1.6 mm gap; prefer 4.8 mm gaps
spend 75% of lifetime in harborage



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American Cockroach Inspections

unused, dry plumbing (floor, sink, toilet)
broken sewer pipes / waste lines



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American cockroach harborage often cryptic



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Fly Inspections

Breeding and feeding sites can differ



**Which is a feeding site?
Which is a breeding site?**

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Fly Inspections



look for breeding habitat in wet, organic decay

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Sanitation Issues and Flies



detailed inspections reveal hidden food items

- under and behind equipment
- back leg zones

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Sanitation Issues and Flies

missing tile grout



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Sanitation Issues and Flies



building design

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When rodents walk over or through the same place frequently, they can leave an oily or greasy substance called:

- A. sputum
- B. sebum
- C. septum
- D. none of the above

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Rodent Inspections

<input type="checkbox"/> droppings	<input type="checkbox"/> runways
<input type="checkbox"/> sebum marks	<input type="checkbox"/> burrows
<input type="checkbox"/> gnaw marks	<input type="checkbox"/> nest material
<input type="checkbox"/> footprints	<input type="checkbox"/> caches

Attractive Elements

<input type="checkbox"/> shadows	<input type="checkbox"/> water
<input type="checkbox"/> warmth	<input type="checkbox"/> food

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Rodent Evidence: Droppings

“rodent feces can provide the pest professional a roadmap to the high-activity areas such as primary runways, preferred corners, food sources and the rodent’s harborages”

-Robert Corrigan
Mallis Handbook of Pest Control

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Know Your... Stuff

pupae
horizontal lines

rodent poop
pointed end
hair mixed in

roach poop
vertical lines
blunt ends



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Poll Everywhere

You can estimate the rodent population by counting the number of droppings?

A. True
B. False

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Mice	Rats
Up to 100 pellets/day Typically 50-60 1/8 to 1/4 inch long	40-50 pellets/day 3/4 inch long 1/4 inch wide
It can be difficult to estimate rodent numbers based on only the number of droppings	

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droppings should be removed
demonstrates if evidence is new or old
removes potential pathogen source



www.cdc.gov/rodents/cleaning

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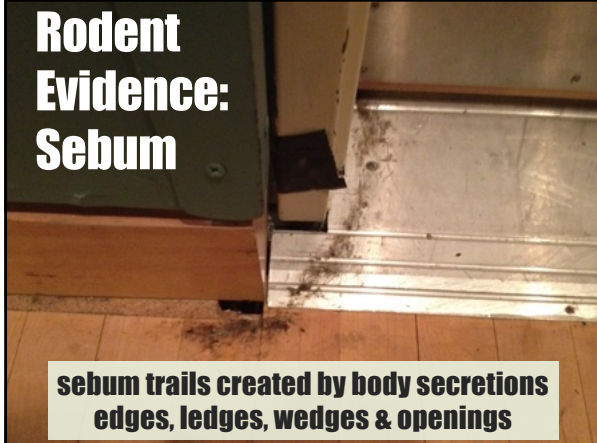
Rodent Evidence: Droppings



Environment matters!
fresh vs. old

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Rodent Evidence: Sebum



sebum trails created by body secretions
edges, ledges, wedges & openings

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Rodent Evidence: Footprints

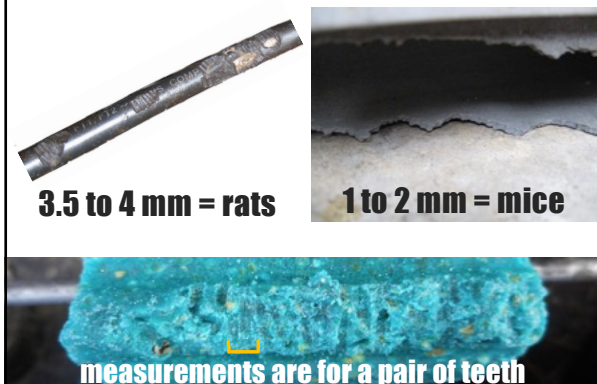


Norway Rats
3/4 to 1 1/4 inch
footprint

House Mouse
3/8 to 3/4 inch
toeprint

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Rodent Evidence: Gnaw Marks



3.5 to 4 mm = rats 1 to 2 mm = mice

measurements are for a pair of teeth

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Entry Points based on rodent skull size

	mouse	rat
gaps	> 1/4"	> 1/2"
openings	> 3/8"	> 3/4"

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XCLUDER
RODENT AND PEST DEFENSE
F.I.T. (Frye Inspection Tool)

MEASURE GAPS:
USE MARKINGS: 1/8" or 1 cm

DIFFERENTIATE BITE MARKS:
USE TIP OF MOUSE PROBE AS SHOWN:
MOUSE: 3/4" (19.1 mm)
RAT: 3/4" - 1 1/8" (19.1 - 29.1 mm)

IDENTIFY DROPPINGS:
MOUSE: 1/8" - 1/4" (3 - 6 mm)
HOUSE RAT: 1/4" - 1/2" (6.3 - 12.7 mm)
ROOF RAT: 1/2" - 1 1/2" (12.7 - 38.1 mm)

BuyXcluder.com

THE PEST MANAGEMENT FOUNDATION
[a non-profit research foundation]

750 W Lake Cook Rd, Suite 400 | Buffalo Grove, IL 60089
Phone: 1.847.495.4700
www.GotXcluder.com

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Poll Everywhere

In your opinion, glue boards and other traps are best used for what purpose:

- Prove the pest pro is doing something
- Reduce pest numbers
- Monitor pest populations
- Protect sensitive areas

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inspection
moment in time

monitoring
record of time

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The Value of Monitoring

regularly spaced monitors will reveal the clumped distribution of pest populations

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**monitoring outcomes:
reveal relative proximity to harborage**

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What is the Status?

Introduction 1+ individuals enter a new area
may or may not establish
relatively easy to manage

- 🐛 deliveries
- 🐛 staff items
- 🐛 outdoors
- 🐛 next door

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What is the Status?

Infestation population established - reproducing
sustained by food, water, & shelter

- ✔ manage pest population numbers
- ✔ prevent spread, new introductions

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introductions will happen

infestations should not

introductions result in infestations when:

- lack of monitoring for early detection
- lack of effective management to reduce #'s
- presence of attractive conditions
- presence of entry route (delivery, openings)
- lack of communication: site & pest control

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Whose Job is it Anyway?

Regular inspections: **you; pest pro; site**

Monitoring for early detection: **pest pro**

Rapid and planned response: **pest pro**

- Reduce pest population: **pest pro**
- Remove conditions conducive to pests: **site**
- Prevent new introductions (exclusion): **site**

Communication: **you; pest pro; site**

Resolution can take weeks to 1+ months

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poor placement

forgotten

broken

broken

don't hesitate to identify broken or ineffective equipment!

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Whose Job is it Anyway?

Note that the pest pro is hired to do a job. Site management may ignore their advice.

Also, some pest pros might be new, lacking experience, expertise & communication skills.

You have a better chance of site management listening to observations & recommendations.

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Poll Everywhere

The most effective way to prevent contamination in food facilities is:

- A. Reduce pest numbers with traps
- B. Kills pests with pesticides
- C. Remove food and water with sanitation
- D. Keep pests out with exclusion

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Summary

Pests are a risk for food safety

Detailed inspections and interpretation of evidence will help you identify risks.

Remember that *exclusion is pest prevention*, and *sanitation is pest control*.

Keep in mind that monitors provide useful information about a pest problem or the control program.

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NEW YORK STATE INTEGRATED PEST MANAGEMENT

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Matt Frye

Cornell Cooperative Extension provides equal program and employment opportunity

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