Cockroaches: Biology and Management

Shaku Nair,
Arizona Pest Management Center
COCKROACHES

So many species!
BEAUTIFUL COCKROACHES
German cockroach *Blattella germanica*

Life stages
German cockroach

- Like warm, humid places
- Proliferate in human homes
- Hide out in cracks and crevices close to food and water sources
Actively growing populations are 80% nymphs and 20% adults

Omnivorous: eats table scraps, pet food, book bindings, dead cockroaches
Egg case contains 30 to 40 eggs

Have elastic oothecae

At room temperature nymphs complete development in 60 days

Life cycle 100 days
German cockroach

- *Salmonella* remains viable in the digestive tract of German roaches for 9 days and on the exoskeleton for 10 days

German cockroach & asthma

Cockroaches are a leading cause of childhood asthma.

An inner-city study found that 36.8% of children are sensitive to cockroach allergens.
German cockroach

Stopping one cockroach does a lot!

One pregnant cockroach

1 January

41 March

1,600 May

18,400 June
American cockroach *Periplaneta americana*

Life stages
American cockroach

Outdoor cockroach
Likes warm, wet places
Largest of the common peridomestic cockroaches - 4 cm in length
During the day they respond negatively to light, resting in harborages close to water pipes, sinks, baths, and toilets, etc.
Omnivorous and opportunistic feeder

Consumes decaying organic matter, prefers sweets, but will eat paper, boots, hair, bread, fruit, book bindings, fish, peanuts, old rice, the soft part on the inside of animal hides, cloth and dead insects
Egg – adult = 600 days
Life span = 400 days

The immatures emerge from the egg in six to eight weeks and mature in about six to twelve months
Carry >22 species of pathogenic human bacteria, virus, fungi, protozoans, as well as five helminthic worms
Oriental cockroach-life stages
- Adults are about one inch in length
- Both are **very dark brown, nearly black**
- Females have small, functionless, wing pads
- Males have wings that cover three-quarters of their abdomen
- Neither fly
- Nymphs and adults are sluggish and usually found at or below ground
Orientals like **cool and damp environments** - basements, between the soil and foundation, underneath sidewalks, under garbage cans, water fountains.

**Not common in the Valley**, but in higher elevations

Mostly feed on **decaying organic matter**
Other species

Turkestan cockroach *Blatta lateralis*
Adult male Turkestan, American and Oriental
Brown banded cockroach

*Supella longipalpa*

Life stages
Brown bands like dry, warm places

Prefer higher locations than other species, often found in upper cabinets in kitchens and bathrooms

Two light-colored bands
wings and abdomen.
wings cover abdomen,
female- not completely

Need less moisture than Germans so tend to be more broadly distributed in the home, such as in living rooms and bedrooms
Problems due to cockroaches

- Make asthma worse in sensitive people
- Cause asthma in preschool-aged children
- Cause or aggravate allergies
- Contaminate food, dishes, and counters
- Smell bad
- Are unwelcome in places where we live, work and play
You never know where they’ve been
Cockroach allergens

• For sensitive people, **eight** units of cockroach allergen per gram of dust can trigger a reaction. ONE female cockroach will produce **1500** units per day!
• Even one cockroach and its frass can be an asthma trigger
• *Getting rid of cockroaches helps, but does not remove the remains. Clean using simple soap to remove allergens*
• *Helps to see when new evidence shows up*
Cockroach allergy

Symptoms

- Chronic stuffy nose
- Frequent ear and sinus infections
- Itchy eyes and nose
- Persistent cough
- Shortness of breath
- Wheezing
- Chest tightness
- Rash
Cockroach allergy

As bad as bed bugs or not?

More people deal or live with cockroaches and associated problems than any other indoor pest!
To beat them, think like them!
Signs
Frass
Monitor – early intervention = minimal chemical exposure, especially important in sensitive environments

Good sanitation

Eliminate harborage

Get rid of: cockroaches, frass, dead bodies, allergens

Behind the wall clock
Baits

Will be effective if there is **no** other food source around
Kitchen Gel Placement

* **Drawers**: Alongside the interior of the door frame
* **Cupboards**: Underneath cupboards where frame meets wall
* **Sink**: Under counter
* **Fume Hood**: Along the inside rear corner of hood
Innovative new gel placement methods
Baits “move”

Baits “transfer” due to behavioral mechanisms including:
- trophallaxis,
- necrophoresis contact,
- coprophagy,
- necrophagy,
- emetophagy

They therefore “move” in the environment
Clean to reduce chemical exposure
Quick review of cockroach management

What are thresholds? For what kind of area and size, for what species, how much time?

A single adult in PVAs (pest vulnerable areas) is ground for additional inspection and monitoring. Other areas, depending on the conditions prevailing. German cockroaches are mostly encountered, but applies to any others also. Assuming regular monitoring of at least weekly.
Quick review of cockroach management

What is a spot treatment? What areas can we spot treat?

“Treatment” can refer to non-chemical methods also!

Spot treatment is for a localized area where the pest problem is suspected or confirmed (e.g., a kitchen pantry, a bathroom).
Quick review of cockroach management

Spot treatments can include:

• Thorough cleaning
• Where possible, sealing cracks, gaps
• Using **compressed air** to flush cockroaches out (set up sticky trap perimeter and vacuum them as they emerge)
• If reasonable non-chemical measures fail, use **baits**.
• Use bait stations or gel placement devices.
Quick review of cockroach management

Chemical methods:

- Baits work best.
- Spray applied liquids are usually less effective for cockroaches, plus they cause unnecessary exposure, and repeated sprays cause residue buildup.
- Sprays also interfere with baits by repelling cockroaches from treated areas!
Why do baits work so well? Target all life stages!

Sprays
• Difficult in clutter
• Long-lasting residual
• Broad spectrum
• Extensive coverage: >AI
• Resistance!

Baits
• Easy to use
• Long-lasting residual
• Specific target sites
• Point sources: <AI
• More Ais; < Resistance
• Secondary kill

Efficacy: Baits >>>>> Residual >>>>>>> TRFs

Image source: Benoit Guénard, NCSU
Baits are not “immune” to resistance!

- Poor performance of commercial baits in some locations.
- Resistance increases with selection pressure.
- Roaches reject a bait ingredient – glucose!
- NO resistance to the insecticide.
- Highly adaptive under toxic bait pressure.
- High levels of resistance to indoxacarb, fipronil and recently, hydramethylnon.
- Use vacuums to remove large pockets of roaches before baiting.
Baits are not “immune” to resistance!

• Take the time to understand the infestation!
• Use “Fecal Focal Points” as a road map for bait placements
• Increase the number of bait placements when sanitation is poor
• Be aware of bait depletion, replenish baits when dealing with large populations
• Don’t place new baits in the same locations as old baits
• Use Insect Growth Regulators to stimulate activity/feeding in pregnant females
Cockroaches
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Shaku Nair, Ph.D.
Associate in Extension, Community IPM
Arizona Pest Management Center
University of Arizona - Maricopa Ag. Center
37860 W. Smith-Enke Road
Maricopa, AZ 85138-3010
Office: (520) 374-6299
nairs@email.arizona.edu