

Cockroaches: Biology and Management



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COCKROACHES



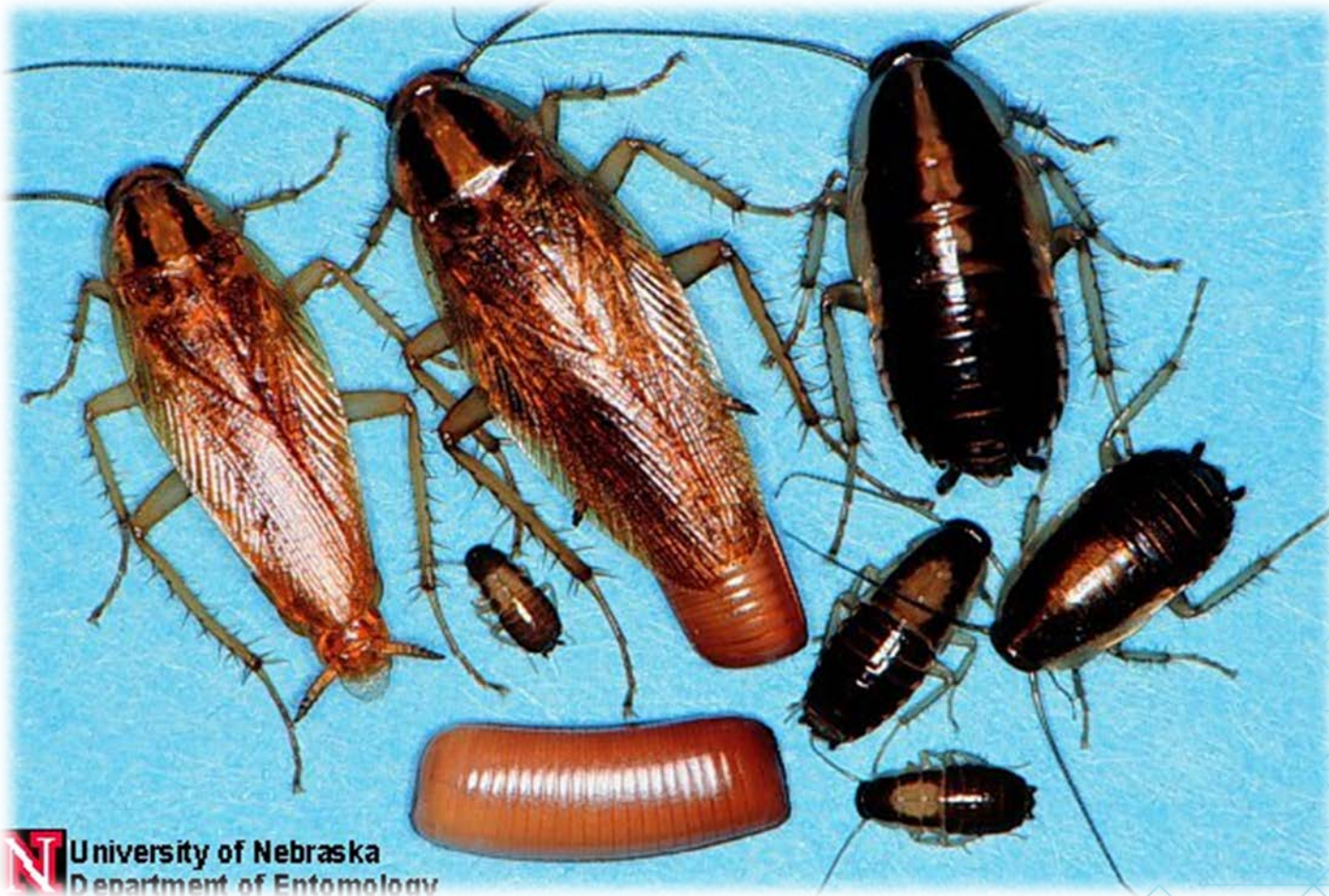
So many species!



BEAUTIFUL COCKROACHES



German cockroach *Blattella germanica*



 University of Nebraska
Department of Entomology

Life stages

German cockroach

- Like warm, humid places
- Proliferate in human homes
- Hide out in cracks and crevices close to food and water sources







Male



Female

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



- *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Salmonella* spp., *Serratia marcescens*, *Shingella*, *Enterobius vermicularis* (pinworm), *Trichuris trichura* (threadworm), *Entamoeba histolytica* (amoebic dysentery), *Gardia* sp. *Poliomyelitis* (paralytic polio)

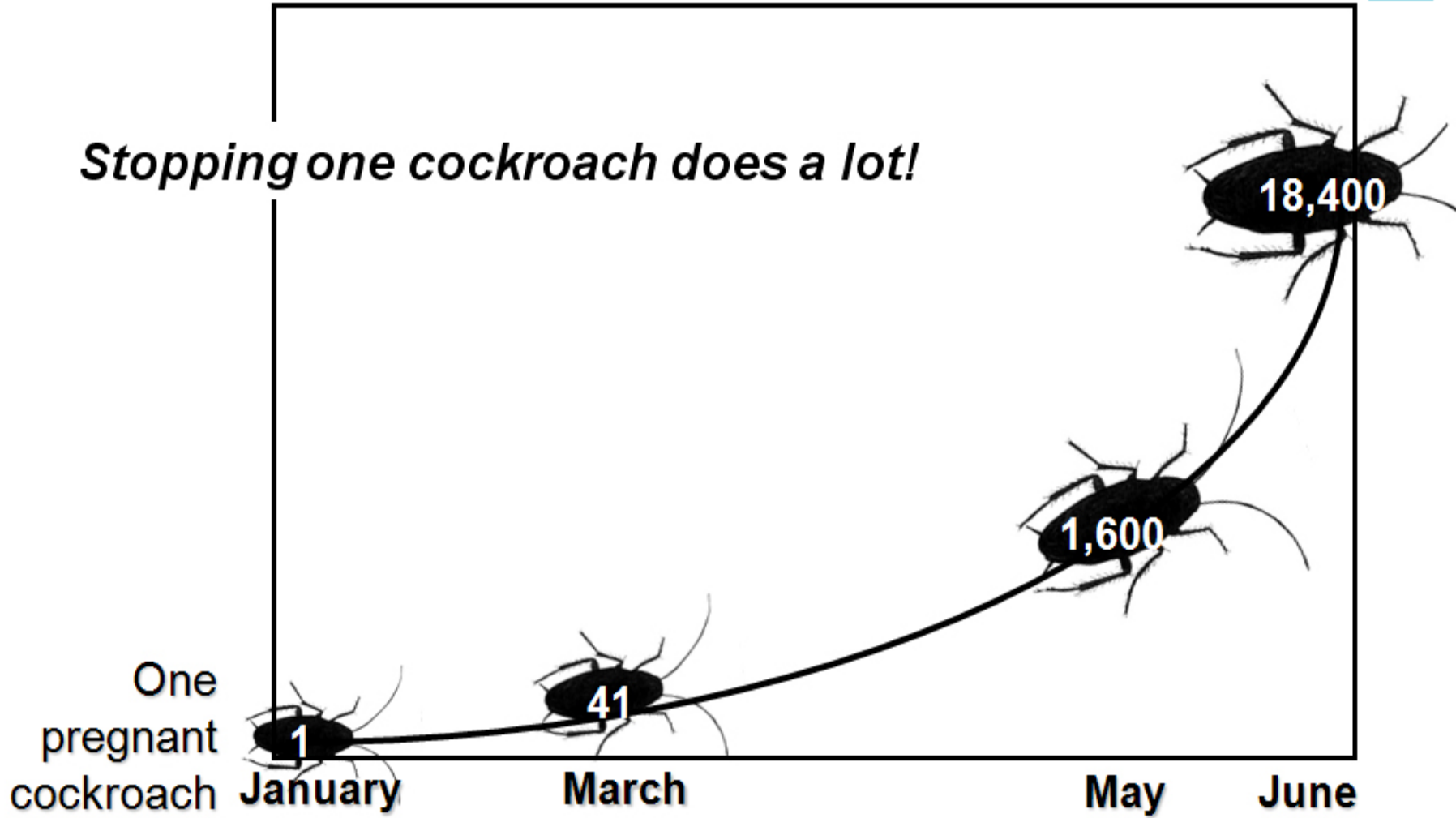
German cockroach & asthma

Cockroaches are a leading cause of childhood asthma

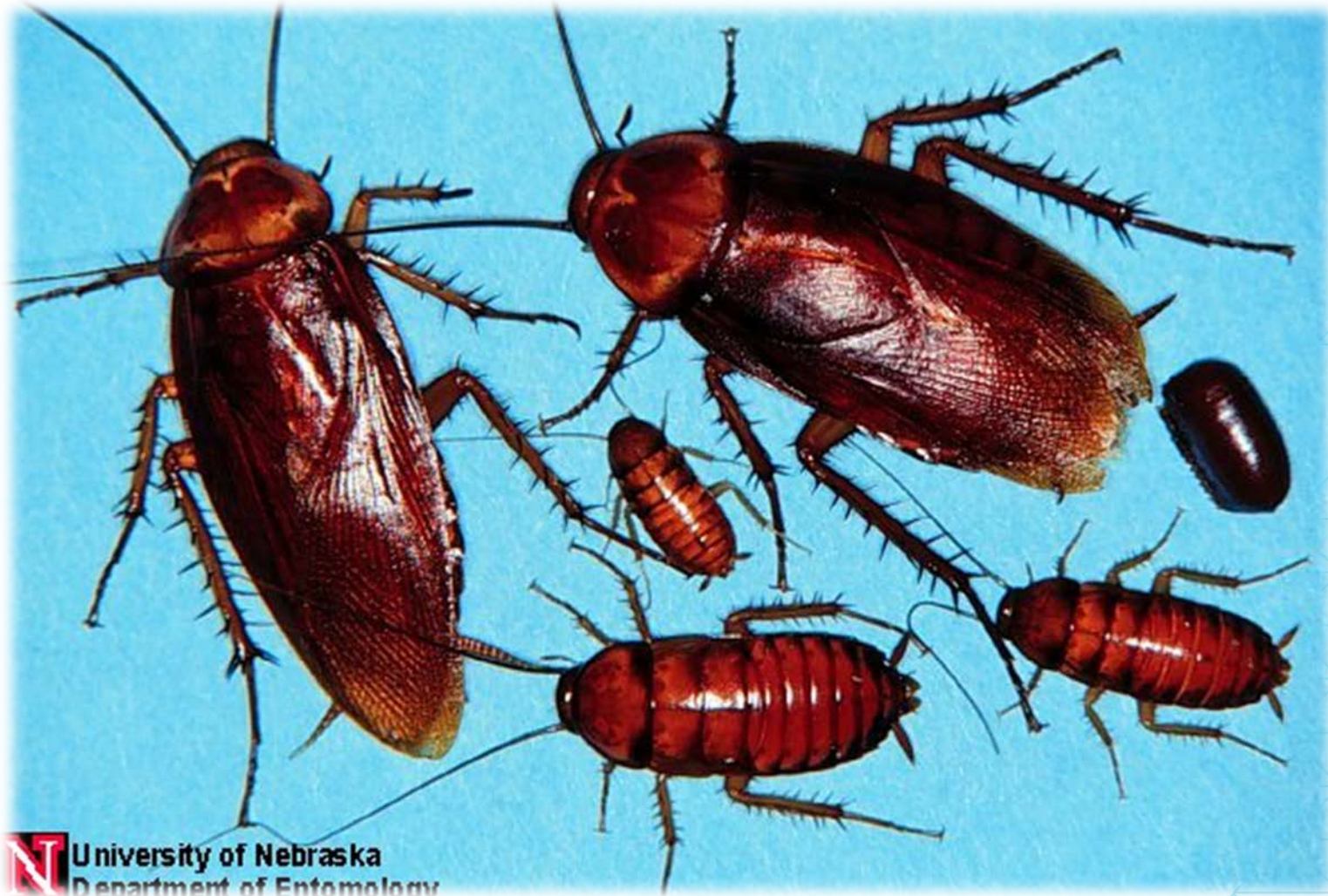


An inner-city study found that 36.8% of children are sensitive to cockroach allergens

German cockroach



American cockroach *Periplaneta americana*



 University of Nebraska
Department of Entomology

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



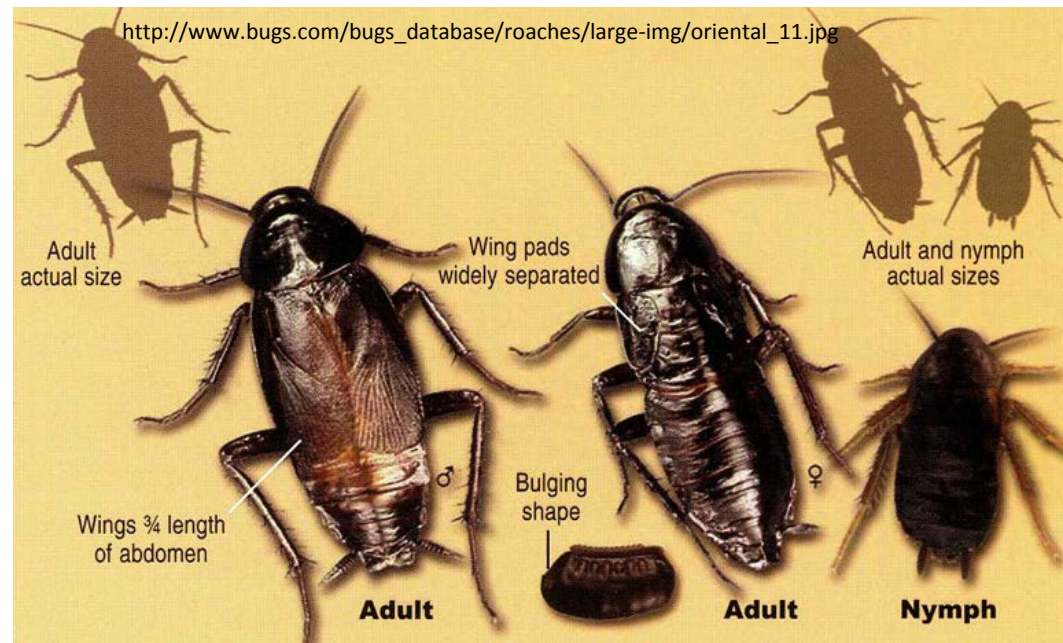
Carry >22 species of pathogenic human bacteria, virus, fungi, protozoans, as well as five helminthic worms



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*



Male

Female





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

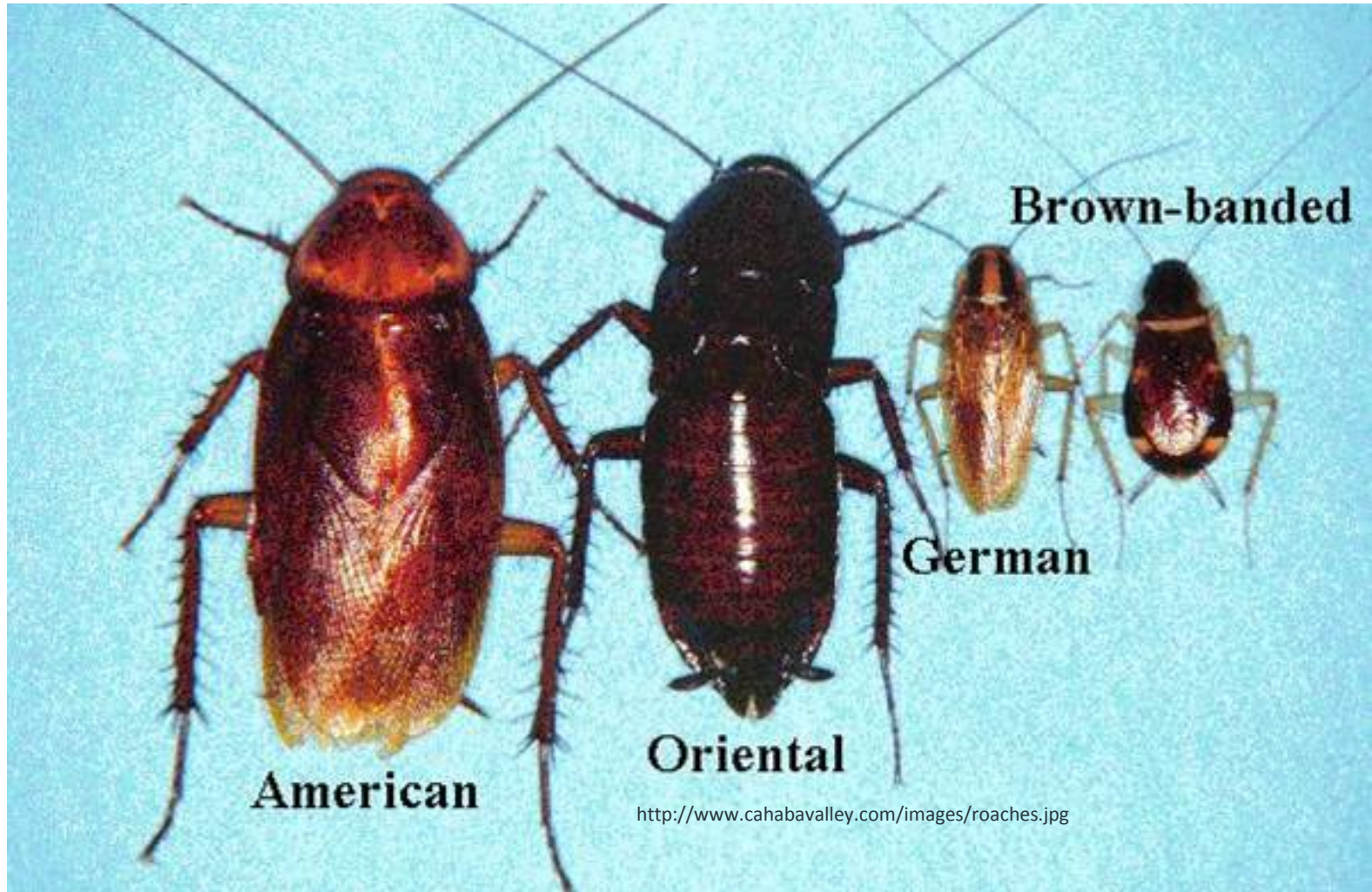
Two light-colored bands

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

Roach Gallery



American

Oriental

German

Brown-banded

<http://www.cahabavalley.com/images/roaches.jpg>

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!



Image source: Benoit Guénard, NCSU

Sprays

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

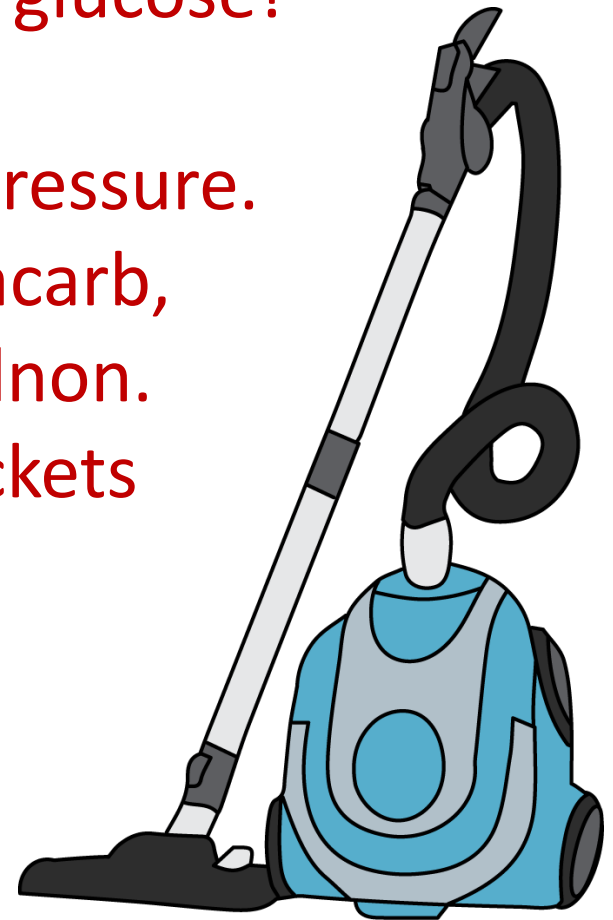
Baits

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

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

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.

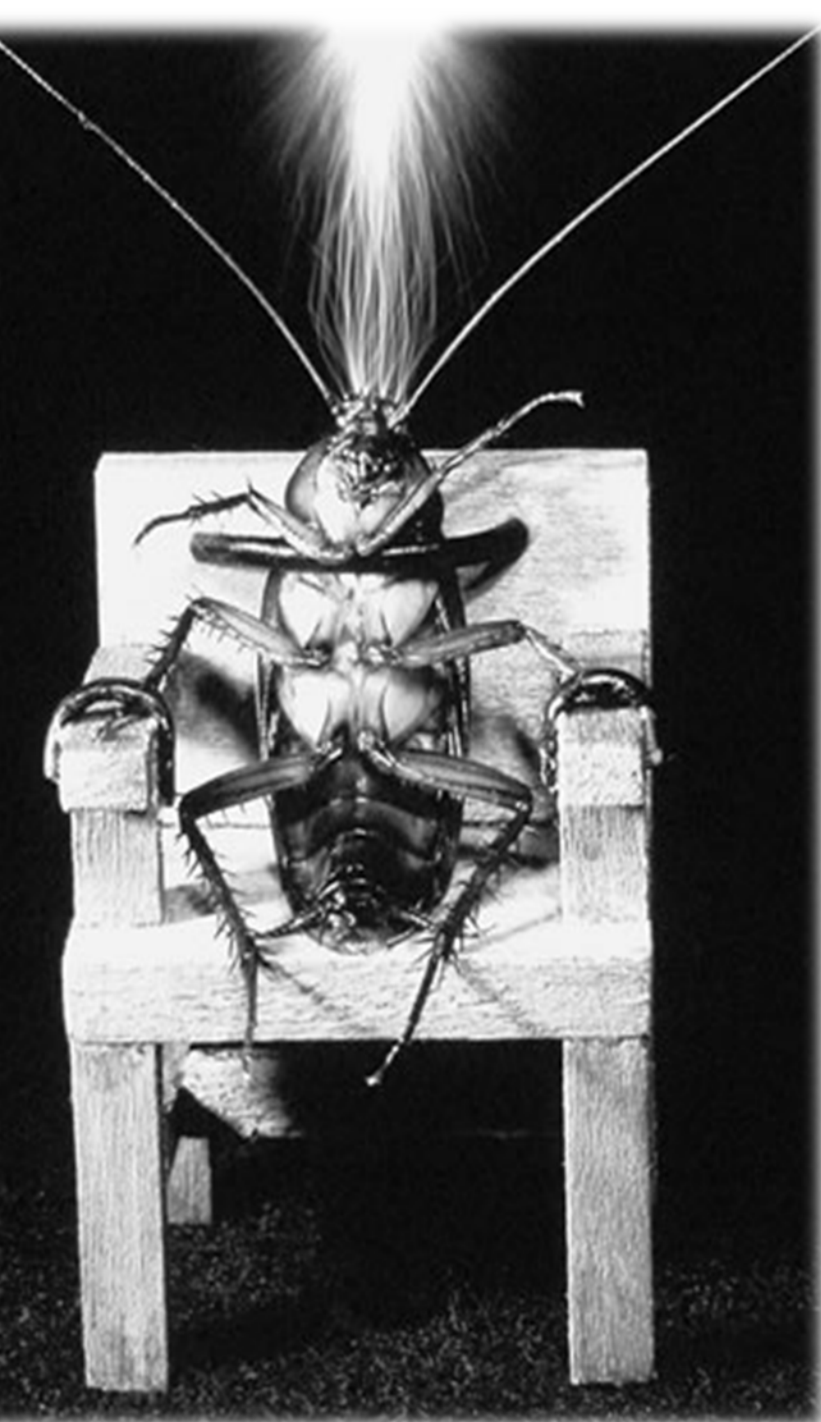


Baits are not “immune” to resistance!

- 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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Thank you!



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