GOOD NIGHT, SLEEP TIGHT, DON'T LET THE BED BUGS BITE!

During the early 20th century, bed bugs were rated among the top three pests in structures. Bed bugs all but disappeared in developed countries, particularly with the widespread use of DDT during the 1940s and 1950s.

Bed bugs feed on the blood of human beings. Birds and mice also. Feed at night. Salivary secretions can cause a person’s skin to itch and become swollen. Scratching can cause infected sores.
Bed Bugs Suck!!!!

Adult bed bugs ¼ inch in length can engorge themselves in less than 15 minutes to three times their original size.

A bed bug’s saliva includes an anesthetic and an anti-coagulant.

Most bite reactions occur immediately. A reaction may take as long as 14 days to develop.

Attracted by warmth and CO2.
Single or clusters (disturbed feeding) of bites.
Bites can be found anywhere, especially exposed skin.
Female bedbugs can lay over 500 eggs.

Each bed bug will molt five times and a blood meal is required each time.

Bed bugs can slow their life process until a blood meal source is found.

- From egg to adult: 5 weeks to four months
- Can live up to 18 months or longer without blood meal
- Adults live about 10 months
Adult male – pointed abdomen

Engorged female – rounded abdomen

• Nocturnal, harbor in clusters
• Hide in daytime in cracks, crevices, etc.
• Travel 5-20 ft. (each way) nightly to feed
• Can remain fully active at <45°F

Bed bugs form aggregations by cueing into fecal matter, and blood.
Inspection

Bed bugs, molts, blood, fecal stains, sweet smell.

• Combine inspection with vacuum cleaning
• Use a brush, flash-light, canister vacuum with a crevice attachment

Inspect sleeping areas around pets, and where bats or birds have entered structures
Pest Insects Associated with Housing & Lodging Environments

Beds and bedding, Headboards, Luggage racks, Wallpaper, Window and door casings, Pictures and artwork on walls, Edges of carpets, Where ceilings and walls meet, Behind light switch covers and outlets, Clothes, Appliances and furniture, Baseboards and carpet stays.

**Bed Bug Species**

Common Tropical Bed Bugs, Bat Bugs, Poultry Bugs, Chimney swift bug and the swallow bug.

Most commonly encountered after bed bugs, is the bat bug, *Cimex adjunctus*.

**Bed bug (common) vs. Bat bug (eastern)**

*C. lectularius* L. Vs. *C. adjunctus* barber

Swallow Bug
Remediation

• Exclusion

Sanitation (vacuuming, etc.),
Hygiene (laundry, furniture steaming, etc.),
Cultural proactive practices,
(maintenance, monitoring, encasing, sealing, pest proofing, etc.).
Residual (non-repellent) pesticides,
Heat / freeze treatments, etc.
“Whole structure” fumigation

WHO ELSE LIVES IN THIS HOUSE?

• Cockroaches
• Flies
• Rodents
• Oh and a few people too!

Pest Insects Associated with Housing & Lodging Environments
**Blattella germanica (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, Shigella, Enteroobius vermicularis (pinworm), Trichuris trichiura (threadworm), Entamoeba hystolytica (amoebic dysentery), Gardia sp. Poliomyelitis (paralytic polio).*

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

Egg case contains 30 to 40 eggs.

Nymphs will often hatch from the ootheca while the female is still carrying it.

Pest Insects Associated with Housing & Lodging Environments
At room temperature nymphs complete development in 60 days.

Whole life cycle in 100 days

Actively growing populations are 80% nymphs and 20% adults.

The cockroach is omnivorous, eating table scraps, pet food, and even book bindings.

American German Cockroaches

TURKESTAN COCKROACH

Blatta lateralis

Male

Female

Pest Insects Associated with Housing & Lodging Environments
Odorous house ants are opportunistic.

Outdoors, ant nests are usually shallow. Nests may be found in mulch, soil, debris, logs, stumps, under stones and under plastic outdoor tarps.

Indoors, nests are usually found in wall voids, around hot-water pipes and heaters, behind paneling, under carpets or beneath the floor.

Colonies can become large and bud to form satellite colonies.
Ants forage night and day. They eat live and dead insects but are also attracted to sweet foods.

They harvest honeydew from aphids and mealybugs. Ants tend aphids and mealybugs to collect the honeydew they excrete.

**Monomorium pharaonis** (Pharaoh ant)

- Tiny, inconspicuous ant, associated with many different pathogens.
  - *Pseudomonas aeruginosa*, *Staphylococcus* spp., *Salmonella* spp., *Clostridium* spp., *Bordetella bronchiseptica*.

Nesting occurs in inaccessible warm (80 to 86°F), humid (80%) areas near food and/or water, such as in wall voids.

Large colonies vary from a few dozen to several thousand or even several hundred thousand individuals.

Approximately 38 days are required for development of workers from egg to adult.
Pediculosis Capitis

Pest Insects Associated with Housing & Lodging Environments
U. S. common among children 3 to 12 years of age.
6 to 12 million have infestations / y.
The most common symptoms are itching and sleeplessness.
Scratching leads to secondary bacterial skin infection.
Head lice: embarrassment; unnecessary days lost from school; pesticide exposure; millions of dollars spent on remedies.

Adults are 2 to 3 mm long, color varies.
The female lives up to 3 to 4 weeks and lays 10 eggs, a day.
Eggs are attached to the hair shaft close to the scalp.
Nits are camouflaged with pigment to match the hair color of the infested person.
Most easily seen at the posterior hairline.
Empty nit casings are easier to see, white against darker hair.

The eggs are incubated by body heat and hatch in 10 to 14 days.
Once the eggs hatch, nymphs leave the shell casing, grow for about 9 to 12 days, and mate, and then females lay eggs.
If not treated, this cycle may repeat itself every 3 weeks.
Lice feed by injecting small amounts of saliva and taking tiny amounts of blood from the scalp every few hours. This saliva may create an itchy irritation.

With a first case of head lice, itching may not develop for 4 to 6 weeks, because it takes time to develop a sensitivity to louse saliva.

Head lice usually survive for less than 2 days away from the scalp at normal room temperature. Their eggs cannot hatch at an ambient temperature lower than that near the scalp.

Launder and dry on a high heat, 130°F.

A louse can crawl 6 to 30 cm per minute. Nits are easier to spot, especially at the nape of the neck or behind the ears, within 1 cm of the scalp.

Nits found more than 1 cm from the scalp are unlikely to be viable.
Head lice are not a sign of uncleanliness and do not vector disease organisms.

The American Academy of Pediatrics and the National Association of School Nurses (www.nasn.org/positions/nitfree.htm)

Pubic lice can live for up to 24 hours off the body

Pubic lice can be spread by sharing clothing, bedding or towels
SCORPIONS

Nocturnal, preferring
Cracks and crevices.

Scorpions are
predatory and feed
mainly on crickets and
cockroaches, etc. Stings are painful but
rarely deadly.

Children, sick, and hypertensive adults,
are vulnerable.

• Scorpions are nocturnal or diurnal.
• The venom of scorpions is used for both
prey capture, defense and to subdue
mates.
• Scorpions can control
the venom flow, so
some sting incidents
are venomless or only
mild envenomations.

• Modify surrounding areas of structures
and pest proof buildings

• Use a
blacklight to
physically
collect and
remove
scorpions

Pest Insects Associated with Housing & Lodging Environments
Liquid food intake

- Webs are used to capture prey and many other purposes
- All are beneficial, few are hazardous

The true black widow spider *Latrodectus mactans*, is the most venomous spider in North America.

The venom is 15 times as toxic as the venom of the prairie rattlesnake.

Mature in 70-90 days
Mating in spring
Incubation: 14-30 days
No. of Eggs: 250-700/sac
Birth Interval: 4 to 9 egg sacs/summer
Lifespan: up to 3 years
Pest Insects Associated with Housing & Lodging Environments
Egg laying primarily occurs from May through July
The female lays about 50 eggs that are encased in an off-white silken sac that is about 2/3-inch diameter.
Each female may produce several egg sacs over a period of several months. Spiderlings emerge from the egg sac in about a month or less.

Their development is slow and is influenced by weather conditions and food availability.
It takes an average of one year to reach the adult stage.

More than 11 species in the US

Adult spiders often live one to two years.
They survive long periods of time (about 6 months) without food or water.
The web is the spider's daytime retreat, and it often is constructed in an undisturbed corner. This spider roams at night searching for insect prey.
Spiders often scavenge on dead insects. Mature males also roam in search of females.

Recluse spiders generally occupy dark, undisturbed sites.
Populations can be dense.
Indoors, they may be found in attics, basements, crawl spaces, cellars, closets, and ductwork or registers.
They may be found in outbuildings such as barns, storage sheds, and garages.
Outdoors, spiders may be found underneath logs, loose stones in rock piles, and stacks of lumber.
Recluse spiders are not aggressive, and normally bites only when crushed, handled or disturbed.

Pest Insects Associated with Housing & Lodging Environments
**SAC SPIDERS**

*Cheiracanthium* spp. overwinter as juveniles and molt into the adult stage during late spring.

In summer, the female lays eggs in a loose mass and covers them with a thin, white silk sac. She conceals the egg sac under leaves, stones, etc. outdoors. However, indoors, she keeps it in a silken retreat in crevices and upper corners. The female guards the egg sac until the eggs hatch.

*T. tranquillus* lays eggs in the fall, and the spiderlings probably emerge from the egg sac in the spring.

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**HOBO SPIDERS**

*Tegenaria agrestis*, indigenous to western Europe introduced into the northwestern United States.

The spiders' ability to produce necrotic lesions and systemic illness was demonstrated in the laboratory in 1986 (see Vest (1987)).

They rarely climb vertical surfaces and are uncommon above basements or ground level.

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**SPIDER MANAGEMENT**

- Remove clutter in and around buildings
- Seal all openings
- Replace outdoor lights with yellow lights
- Vacuum, vacuum, vacuum!
  - Spiders are resistant to many insecticides.
- WebAway
- Crack and crevice treatment with DE
There are many more accidental deaths, all preventable.

So why do bees sting?
Bee Stings

• Scrape them off
• Apply salt

Are all stings equal?

• An Africanized bee is no more venomous than a domestic European honey bee. But a larger % of the hive population is defensive.

• AHB can be distinguished from EHB only by measurements or DNA analysis

Colonies can live indefinitely, typically 1-5 years and the bees are active year round in Arizona.
Favorite places are also abandoned buildings, trailers, or uninhabited out buildings.

Resting swarms may hang around for 2-3 days before moving on. They are generally not aggressive.
Keep the sting area clean, watch for signs of allergic reactions:

- Difficulty in breathing or swallowing.
- Fainting or turning pale (low blood pressure).
- Large swellings away from the sting site, often eyes, lips, neck, hands or feet (angioedema).
- Red spots or rash, usually itches (urticaria).

If either of the first two symptoms, 911

If either of the second two symptoms, seek medical care quickly.

Differences Between Hives and Swarms

<table>
<thead>
<tr>
<th>Hives</th>
<th>Swarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent:</td>
<td>Temporary:</td>
</tr>
<tr>
<td>Present weeks +</td>
<td>Present 1-4 days</td>
</tr>
<tr>
<td>Usually in holes, walls, trees</td>
<td>Always exposed &amp; open</td>
</tr>
<tr>
<td>Most bees not visible</td>
<td>Visible cluster of bees</td>
</tr>
<tr>
<td>Usually much flight activity</td>
<td>Usually quiet, little flight</td>
</tr>
<tr>
<td>If exposed, comb seen</td>
<td>Comb not present</td>
</tr>
<tr>
<td>Often defensive</td>
<td>Very rarely defensive</td>
</tr>
<tr>
<td>Bees with yellow/orange pollen on legs arriving</td>
<td>Pollen-laden bees not seen</td>
</tr>
</tbody>
</table>

Removal of a Swarm

Go to scene, suit up, get equipment ready

Place plastic sheet under swarm and tub with a gallon of 2% dish detergent in water directly below swarm

CALMLY, SLOWLY, and GENTLY spray a mist of 2% dish detergent in water on all outer parts of the swarm

Take your time, you want the bees to think it is raining, not a threat.
Detergents for Killing Swarms

Any supermarket detergent will do – Ivory, Dawn, Palmolive, Joy, – these are just ones I know, most any will work.
Make approximately 2% solution (1/3 cup per gallon) in sprayer; swirl to mix, but don't make lots of suds.
1-2 gallons should do.

M-Pede is actually registered for this use, but any detergent is effective.

OTC Insecticide Labeled for Bees

Raid® Wasp & Hornet Killer:
- Paper-Nest Wasps
- Bald-Faced Hornets
- Yellow Jackets
- Mud Daubers
- Bees

Tetramethrin and permethrin

A bad plan!!!
Mosquito Management Strategies

- Habitat Modification
- Mosquito Abatement Districts
- Biological Control
- Insecticide Control
Insect Repellents

- Effective but can cause skin sensitivity to develop. E.g. Off.
- Limited protection time. E.g. Skin So Soft Bug Guard.
- Lavender oil Not suitable for children under 2.
- Eucalyptus oil Effective and safe. E.g. Off Botanicals.
- Picaridin Effective and safe. E.g. Cutter Advanced.
- Soybean oil Effective and safe. E.g. Bite Blocker for Kids.
- Permethrin For use on clothing only.

Filth Flies
The Most Important Indicators

- Blow flies
- Flesh flies
- House flies
- Drain flies
- Lots of other flies

- **Calliphoridae**
  - Blow flies
  - Arrive within minutes
  - Eggs in clusters around body openings

- **Sarcophagidae**
  - Flesh flies
  - Larviposit
  - Migrate up to 30 ft as pre-pupae
Moth Flies

Rabies / Plague

Feral Cats and Dogs

Pest Insects Associated with Housing & Lodging Environments
Cats and Dogs Need to be Loved and Cared for at Home

- Round worms
- Hook worms
- Tape worms
- Giardia
- Toxoplasma
- Cryptosporidium
- Various Enteric Bacteria
- Fleas and ticks
- Tinea

Rodents

Birds

Psittacosis

Bird flu

Pest Insects Associated with Housing & Lodging Environments
Subterranean Termites

Species

Western subterranean – Reticulitermes hesperus
Eastern subterranean – Reticulitermes flavipes
Formosan subterranean – Coptotermes formosanus
Desert subterranean – Heterotermes aureus
Arid-Land subterranean – Reticulitermes tibialis
Pest Insects Associated with Housing & Lodging Environments

**Signs**
- Mud tubes
- Swarmers
- Wood damage

**Problematic Construction Practices**
1. Wood to soil contact
2. Form boards, tub trap boxes, and spacers not removed after construction.
3. Wooden debris left inside CMUs.
4. Wood refuse buried under the slab.
5. Stucco below grade. Stucco, brick veneer or EFIS below grade.

**Know the Difference Between Ants and Termites**

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*Ants vs. Termites*

- **Ants**
  - Both pairs of wings are equal in size
  - Antennae have 12 segments
  - Claws (tarsi) are larger

- **Termites**
  - Both pairs of wings are unlike in size
  - Antennae have 10 or 11 segments
  - Claws (tarsi) are smaller