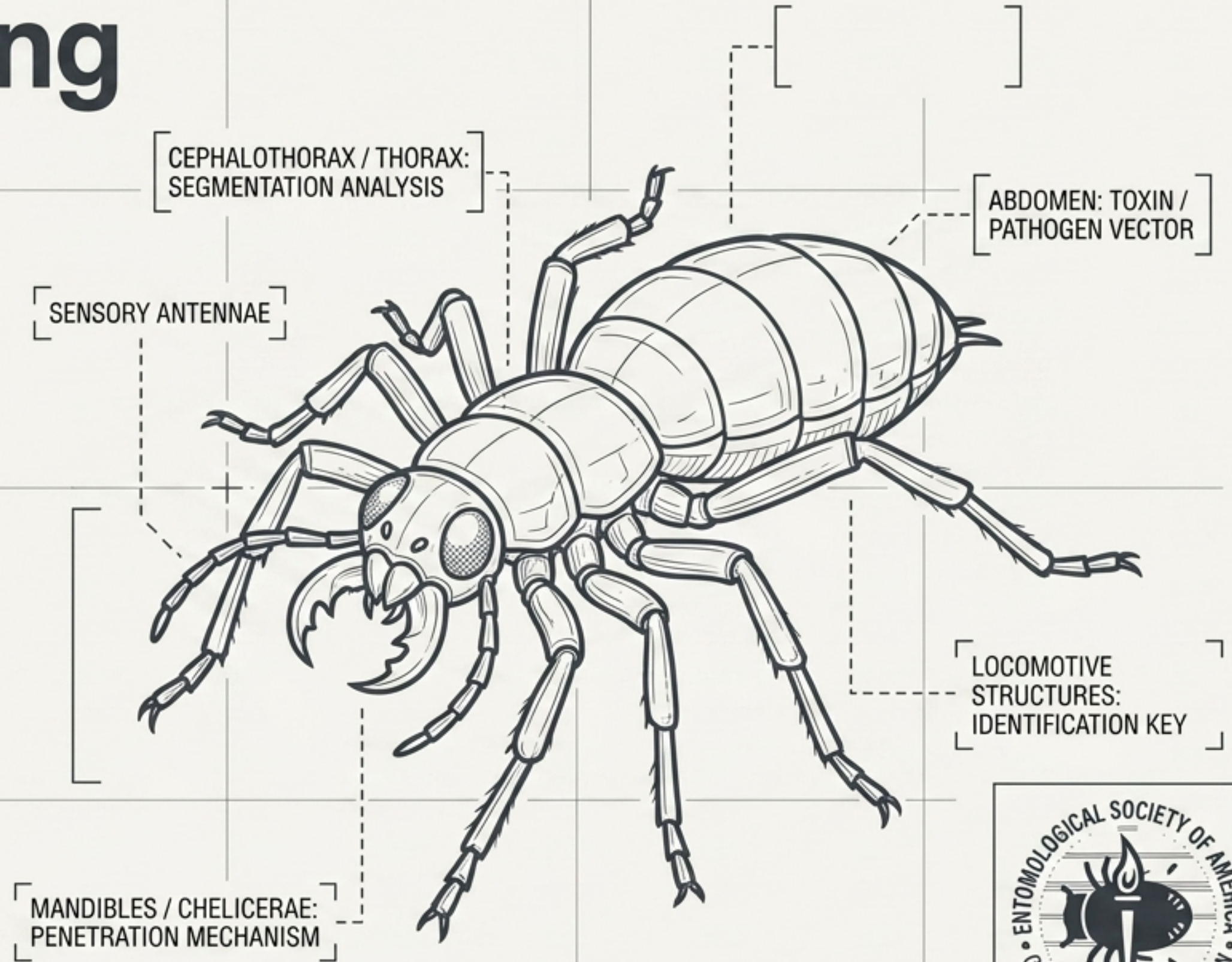


Biting & Stinging Pests: The Diagnostic Field Guide

A Clinical Blueprint for
Identification, Medical
Significance, and
Control Logic

Entomological Society of America /
ACE Preparation Course



THE ARTHROPOD THREAT LANDSCAPE

COLUMN 1



THE BLOOD FEEDERS & VECTORS

Mechanism: Stealthy parasitism.

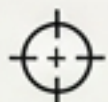
Key Threats:

- ◉ Bed bugs
- ◉ Fleas
- ◉ Lice
- ◉ Mites
- ◉ Ticks
- ◉ Mosquitoes



MEDICAL RISK: Disease transmission, anemia, allergic dermatitis.

COLUMN 2



THE SOLITARY HUNTERS

Mechanism: Venomous defense and accidental encounters.

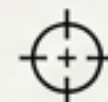
Key Threats:

- ◉ Recluse, Widow, and Sac Spiders
- ◉ Scorpions



MEDICAL RISK: Necrotic or neurotoxic envenomation.

COLUMN 3



THE SOCIAL DEFENDERS

Mechanism: Swarming and structural invasion.

Key Threats:

- ◉ Hornets
- ◉ Wasps
- ◉ Yellowjackets
- ◉ Bees



MEDICAL RISK: Mass stinging, severe structural damage from abandoned nests.

DIAGNOSTIC MATRIX: HUMAN ECTOPARASITES



BED BUGS (*Cimex lectularius*)



Hides in cracks/crevices both on and off beds. Survives 2-6 (up to 12) months without a host.



Control: Environmental sprays and localized crack/crevice treatments are critical.



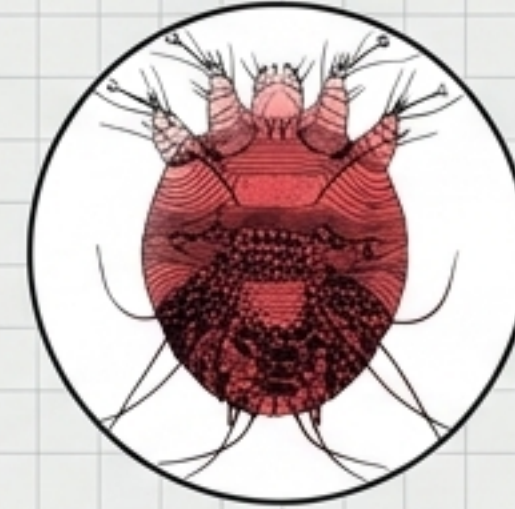
LICE (*Phthiraptera*)



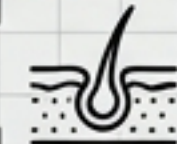
Transmitted by intimate contact. Head, Body, and Crab/Pubic varieties. Not a known disease vector.



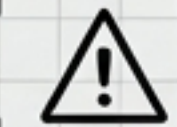
Control: Prescription/OTC pediculicides on the host. Environmental sprays are usually unnecessary and inappropriate.



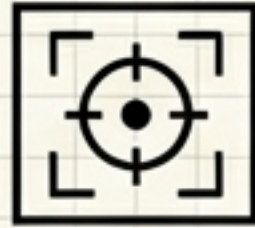
SCABIES MITE (*Sarcoptes scabiei*)



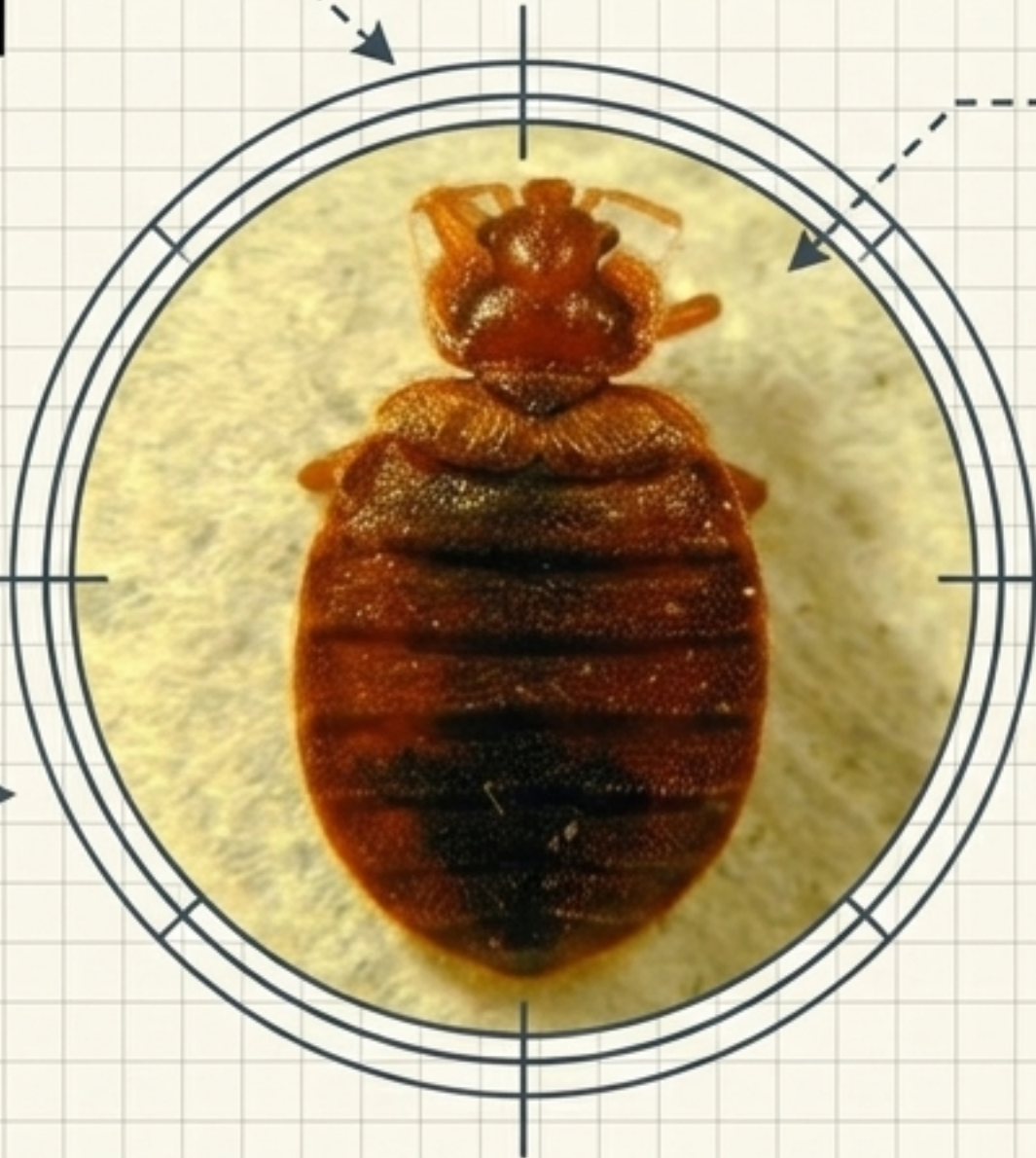
0.2-0.4 mm (microscopic). True human skin parasite. Causes severe itching not restricted to feeding sites.



Control: Medical treatment of the host. Environmental sprays are completely inappropriate.



Host

TARGET DOSSIER: THE BED BUG (*Cimex lectularius*)

DIAGNOSTIC MARKERS:

- Apple-seed sized (3/16 inch).
- Wingless, flat, oval body.

BIOLOGY & BEHAVIOR:

Must feed on blood from humans, pets, birds, or bats. Bites are typically painless. Nymphs and adults can move quickly. Heavy infestations produce distinct odors.

FIELD EVIDENCE:

Fecal spotting on structural elements.



Medical
Significance

HABITAT:

Found in cracks and crevices during daylight. Crucial: They do not only hide in beds; they are found in a wide variety of situations across the environment.



Habitat



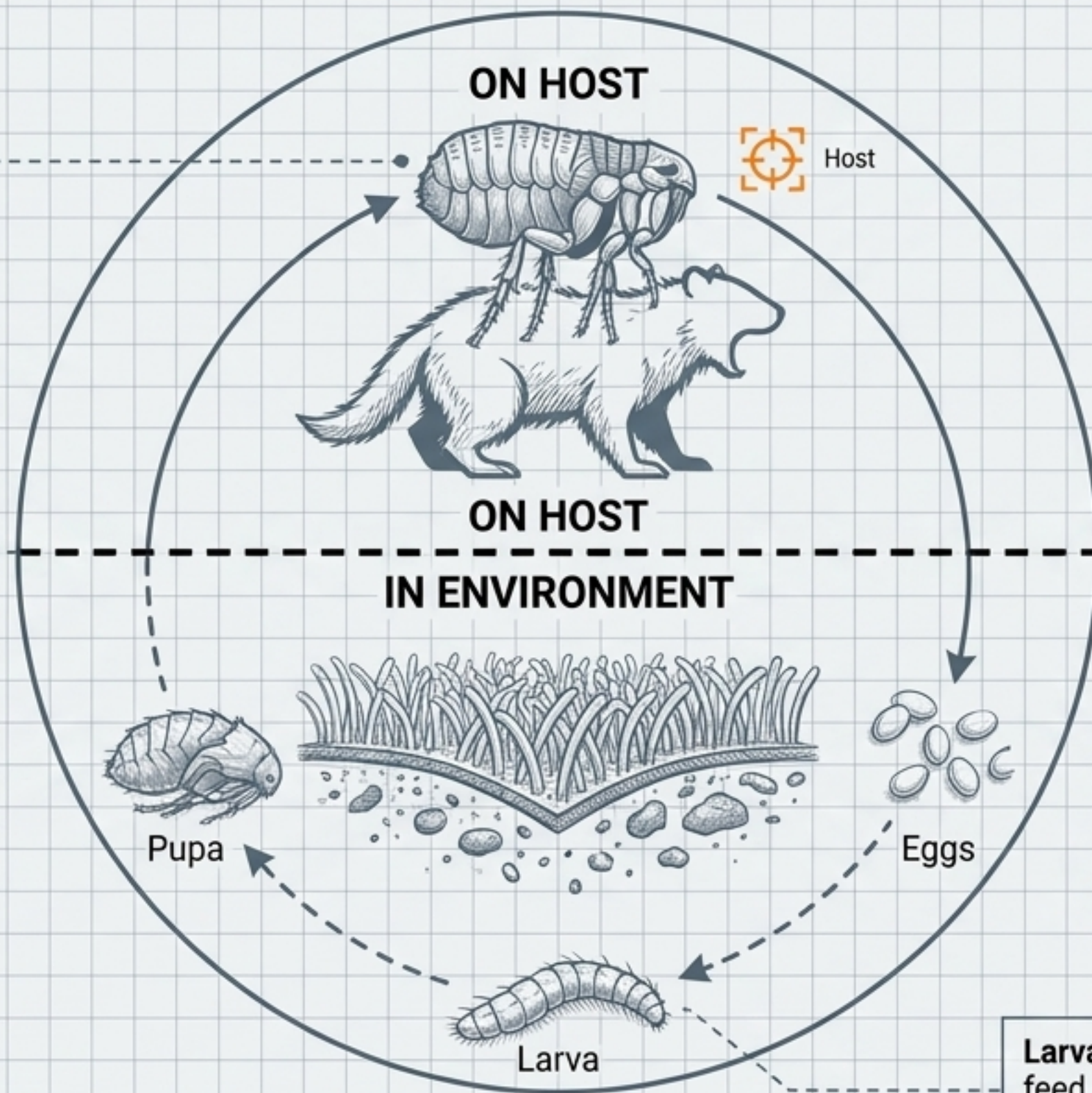
The Biological Loop: Fleas (Siphonaptera)

MICROSCOPIC VIEW:



MICROSCOPIC VIEW:
LATERAL FLATTENING

Pathology Risk: Flea Allergy Dermatitis (FAD), Anemia, Tapeworm (*Dipylidium caninum*), Bubonic Plague (rat flea).



The Control Disconnect: The adult is the **ONLY** stage spent on the host. Over 95% of the population (eggs, larvae, pupae) is in the environment.



Medical Significance



Habitat

Larval Dependency: Flea larvae must feed on dried blood (flea dirt) falling from the host to develop.

VECTOR TRANSMISSION PATHWAYS: HARD TICKS (Family Ixodidae)

THREAT PROFILES



LONE STAR TICK
(*Amblyomma americanum*)



BLACK-LEGGED DEER TICK
(*Ixodes scapularis*)

KEY US SPECIES:

- American dog tick
- Lone star tick
- Black-legged deer tick
- Brown dog tick



HOST



MEDICAL
SIGNIFICANCE



HOST 1
(PATHOGEN SOURCE)

DROP OFF & MOLT



HOST 2

DROP OFF & MOLT



HOST 3
(HUMAN VICTIM)

THE 3-HOST CYCLE

Ticks rarely hatch with pathogens. They must feed on an infected host, detach, molt, and then attach to a subsequent host to vector the pathogen.



HABITAT



ATTACHMENT

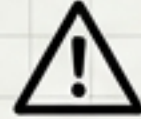
Ticks may remain attached to the skin for several days during a blood meal.

Outdoor & Edge-Environment Feeders

The Aerial Vectors



HOST



MEDICAL
SIGNIFICANCE

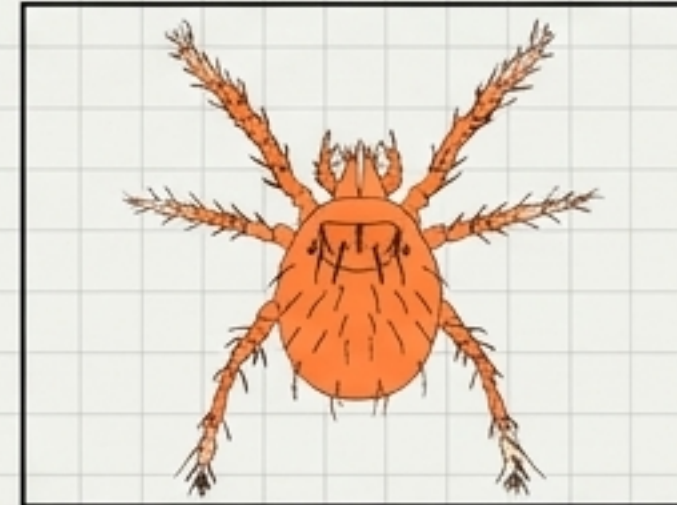
Mosquitoes (Order Diptera, Family Culicidae): ~170 species in North America.

- **Culex:** Delicate night-time biters. Primary vector for West Nile Virus (WNV).
- **Aedes:** Aggressive day and evening biters. Produce itching, colorless welts.

The Edge-Habitat Parasites



HOST



HABITAT



MEDICAL
SIGNIFICANCE

Chiggers:

- **Parasitic Stage:** Only the immature (nymphal) stage of *Eutrombicula alfreddugesi* is parasitic.
- **Habitat:** Live outdoors, heavily concentrated in ecological transition zones (edge habitats).
- **Bite Pattern:** Target areas of tight-fitting clothing (socks, waistbands).

DIAGNOSTIC MATRIX: VENOMOUS ARACHNIDS

THE MEDICAL THREATS



Brown Recluse
(*Loxosceles reclusa*)

Fiddle-shaped mark, 3 pairs of eyes.
Nocturnal hunter, 1-3 yr lifespan.



Venom: Necrotic.

Black Widow
(*Latrodectus* sp.)

Hourglass marking, irregular
cobwebs. Found in outhouses, sheds.



Venom: Neurotoxic.

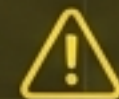


THE LOOKALIKES/LESSER THREATS



Sac Spiders
(*Miturgidae*)

Builds flattened silk tube (retreat).
Common indoor/outdoor.



Venom: Necrotic in
some species.

Hobo Spider
(*Agelenidae*)

Funnel weaver. Pacific Northwest
(WA, OR, ID, UT).



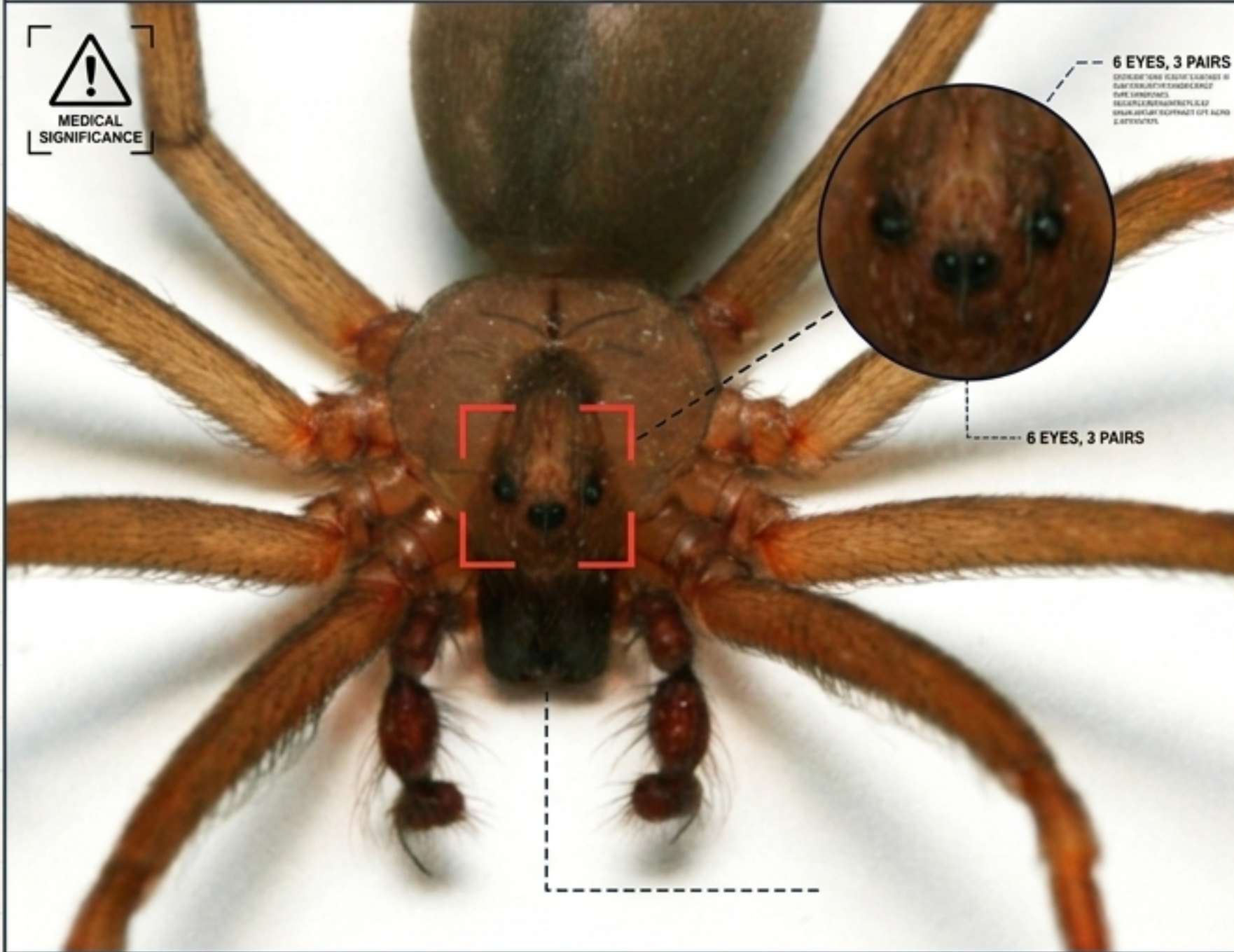
Venom: Not believed to be
a significant necrotic threat.



Visual Identification Targeting: The Big Two

Field Dossier
Diagnostic Manual

Target 1: Brown Recluse



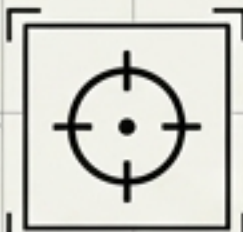
The Fiddle & The Eyes: The Brown Recluse is definitively identified not just by the violin mark on the cephalothorax, but by possessing exactly 6 eyes arranged in 3 pairs (a semicircle).

Target 2: Black Widow



The Hourglass & The Web: Black Widows (5 US species) are identified by the red hourglass and their highly irregular, messy cobweb structures, typically in dark, undisturbed areas.

Target Dossier: Scorpions (Class Arachnida: Order Scorpiones)



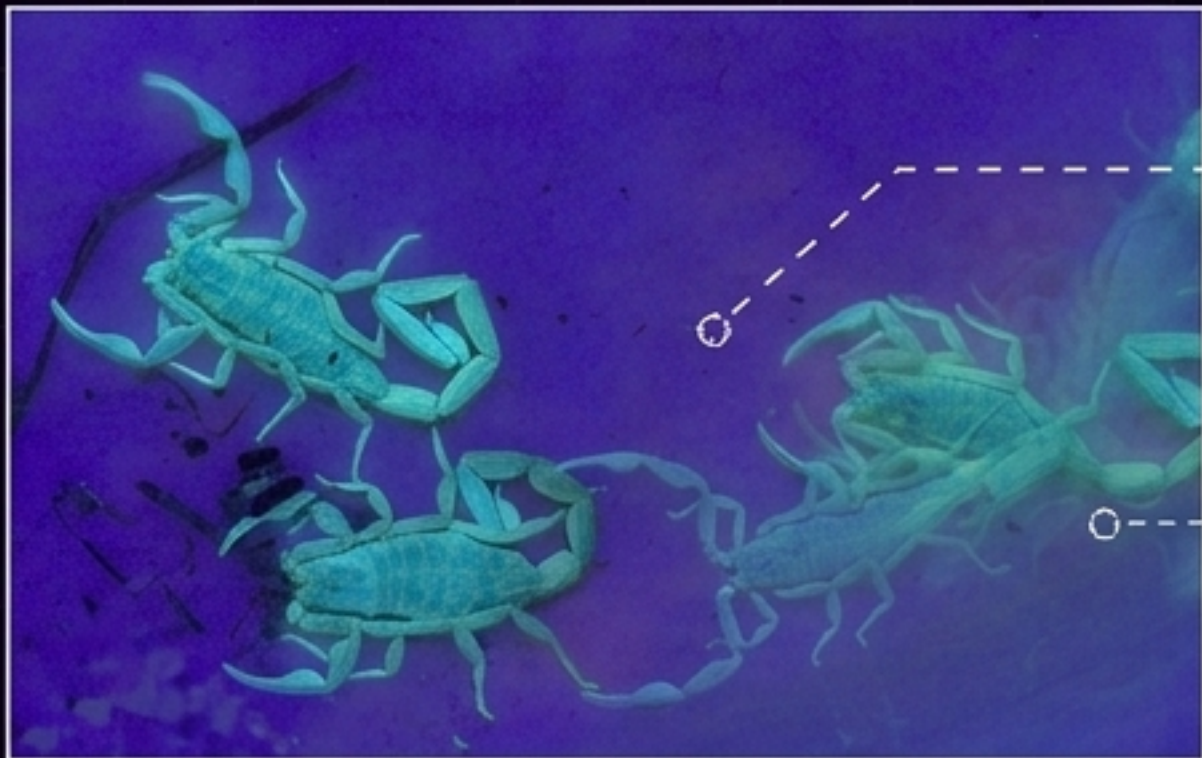
Biology

Nocturnal hunters that feed on insects.
Venom is neurotoxic.



Medical
Significance

While all scorpions sting, the Arizona bark scorpion is the most medically important species in the US.



Detection

Exoskeleton fluoresces brilliantly under black light (UV), making nocturnal inspections highly effective.

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Architectural Profiling: Wasps & Hornets



Hornets

(e.g., Bald-faced, European)



Construct inverted, enclosed paper carton nests up to 3 feet long. Mature colonies: 200–400 workers.



Host



Medical
Significance

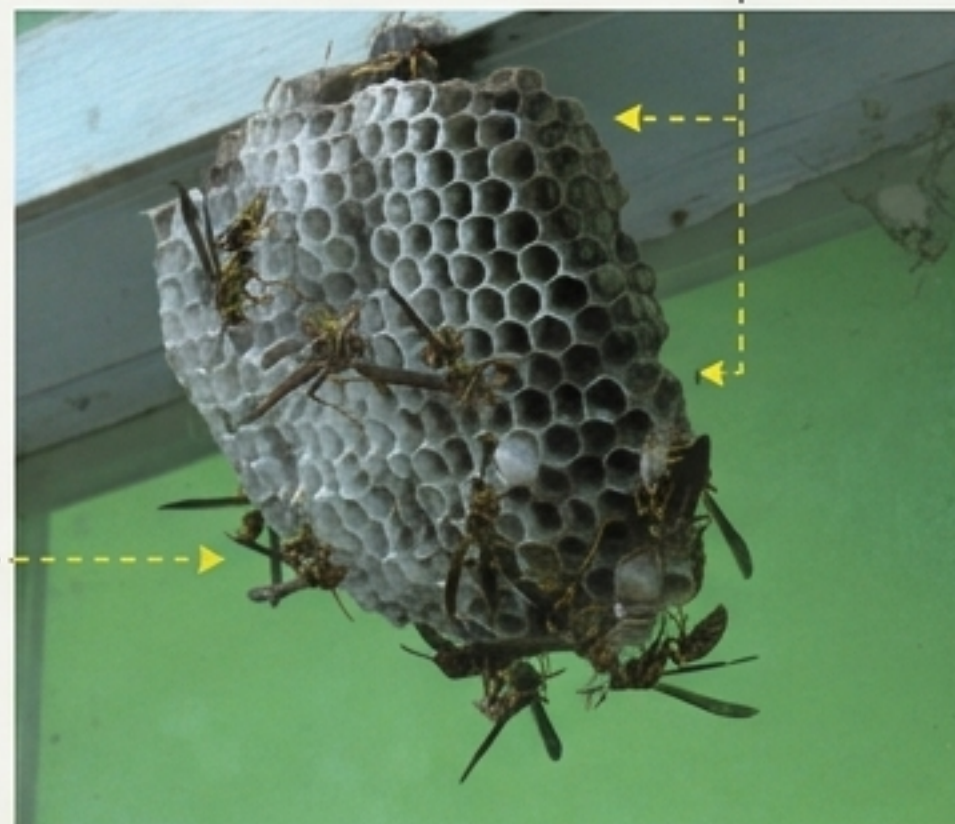


Habitat



Paper Wasps

(Polistes)



Umbrella-like nests with exposed brood chambers. Smaller colonies: Less than 200 workers.



Host



Medical
Significance

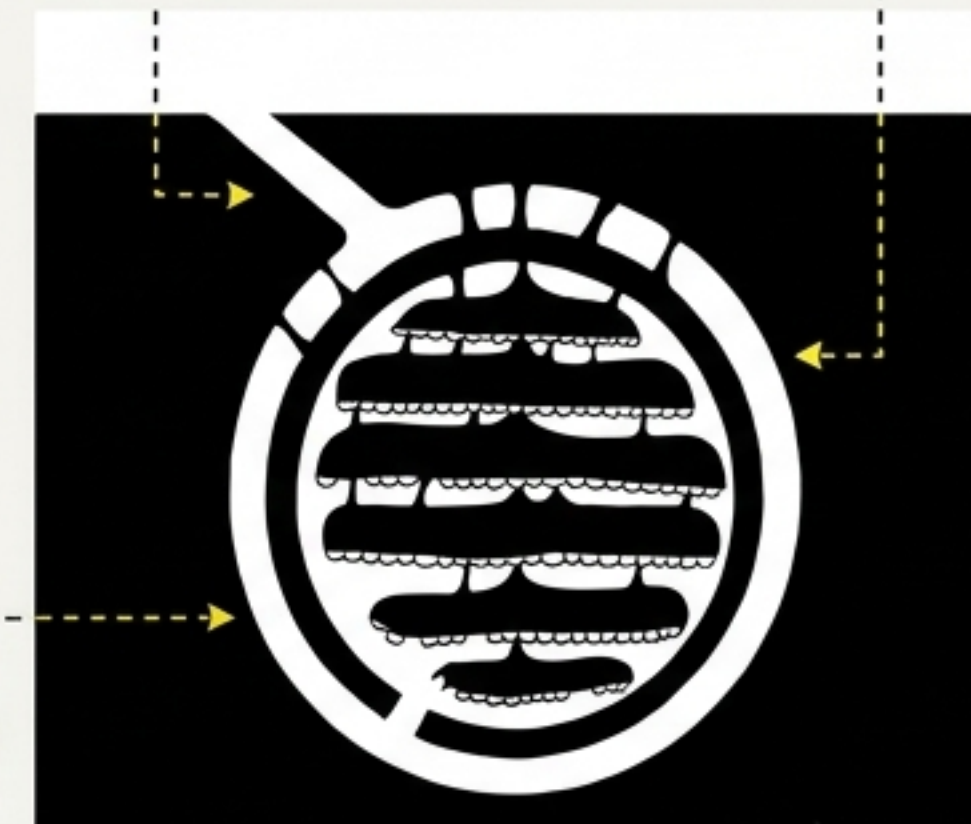


Habitat



Yellowjackets

(Vespula)



Primarily ground nesters. Annual colonies of up to 2,000–20,000 workers. Highly aggressive defenders in the fall.



Host



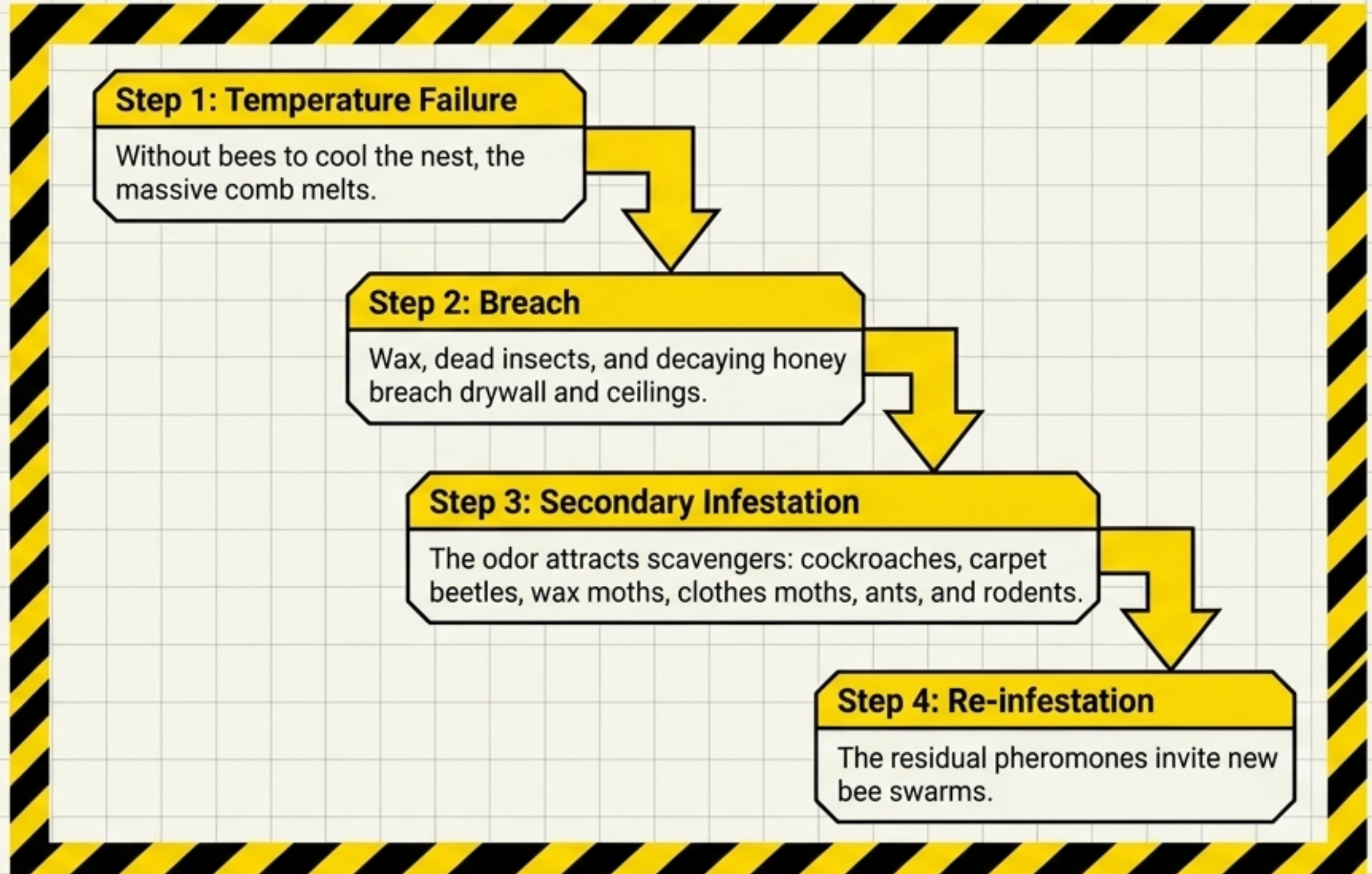
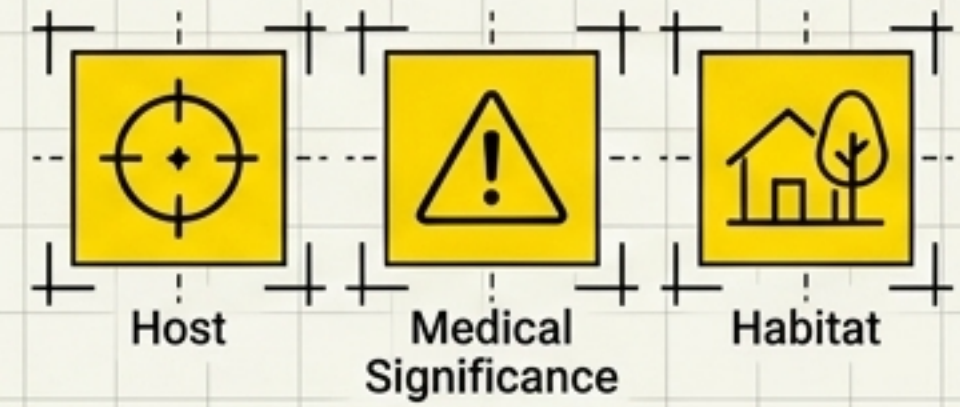
Medical
Significance



Habitat

The Structural Cascade: Honey Bees (*Apis mellifera*) in Wall Voids

Colonies of 10,000+ bees enter through small holes, nesting up to 20ft deep.
Exterminating the bees without removing the hive triggers a cascading failure:



The Treatment Logic Framework



HOST TARGET

Rule 1: Treat the Host

If it is an obligate resident of the host, treat the host.

(Example: Lice, Scabies.
Environmental space sprays
are useless).



ENVIRONMENT TARGET

Rule 2: Treat the Environment

If only one life stage is on the host, treat the environment.

(Example: Fleas, Bed Bugs, Ticks.
Control targets the off-host
breeding grounds and harborages).



ARCHITECTURE TARGET

Rule 3: Remove the Architecture

If it is a social defender, remove the architecture.

(Example: Honey bees, Hornets.
Killing the insects without physically
extracting the nest guarantees secondary
structural and pest disasters)

Effective diagnosis isn't just identifying the pest—it's identifying the pest's biological vulnerabilities.