Chemical Free Beekeeping?

Jeff Harris

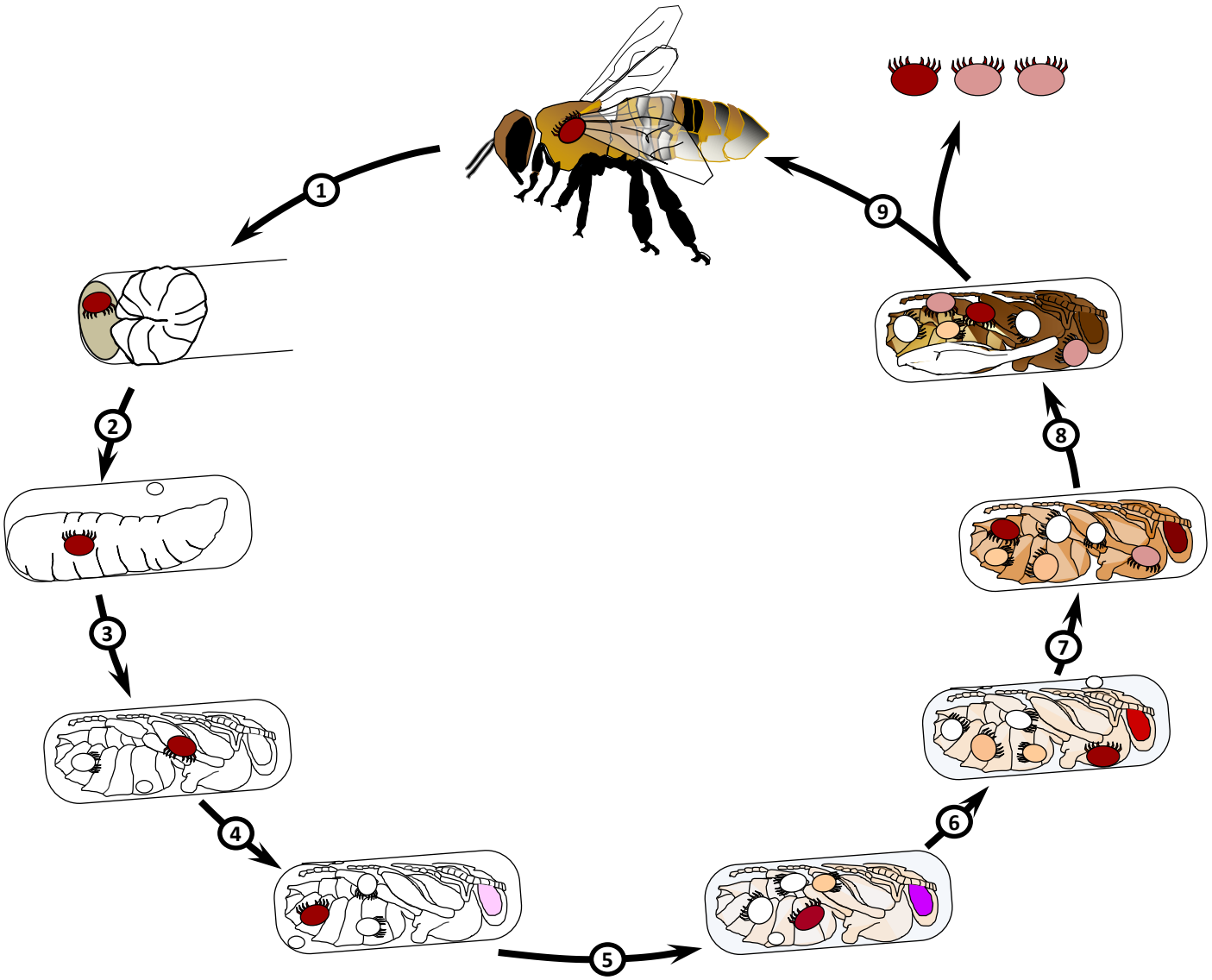
Extension/Research Apiculturist
Department Biochemistry, Molecular Biology, Entomology & Plant Pathology
Mississippi State University, MS 39762

Mississippi State University Extension Service

MAFES

Mississippi Agricultural & Forestry Experiment Station


Varroa destructor Anderson & Trueman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Damage to Bees: Viruses!!!

Parasitic Mite Syndrome
(the end is near)

“I am a new beekeeper, and I’m overwhelmed…!”

New Beekeeper Recommendation

- Regimented treatment for 2-3 years
- Amitraz (Apivar) as a summer treatment
- Organic acids (formic and oxalic) during spring and fall
- Begin to learn about IPM and implement

Mite Away Quick Strips II (Formic Acid)

- Temperature sensitive
- Can be used during honey flow
- Effective when used as directed by label

Chemical Control of *Varroa*

- **48.4% active ingredient**
- **cheap; natural component**
- **low residues in hives**
- **blocks electron transport in mitochondria**
- **50-79 F**
- **decreased worker lifespan and brood survival**

formic acid

Chemical Control of *Varroa*

- **cheap; sold as wood bleach**
- **low residues in hives**
- **blocks electron transport in mitochondria**
- **increased queen and brood mortality**
- **not legal in the U.S.**

Safer Miticides – Oxalic Acid Dihydrate

- Oxalic Acid is sugar syrup sprayed on package bees
- Oxalic Acid in sugar syrup trickled between combs and hive spaces
- Oxalic Acid Dihydrate heated to release fumigant acid into hive environment

Recommendation from EPA

To delay resistance:

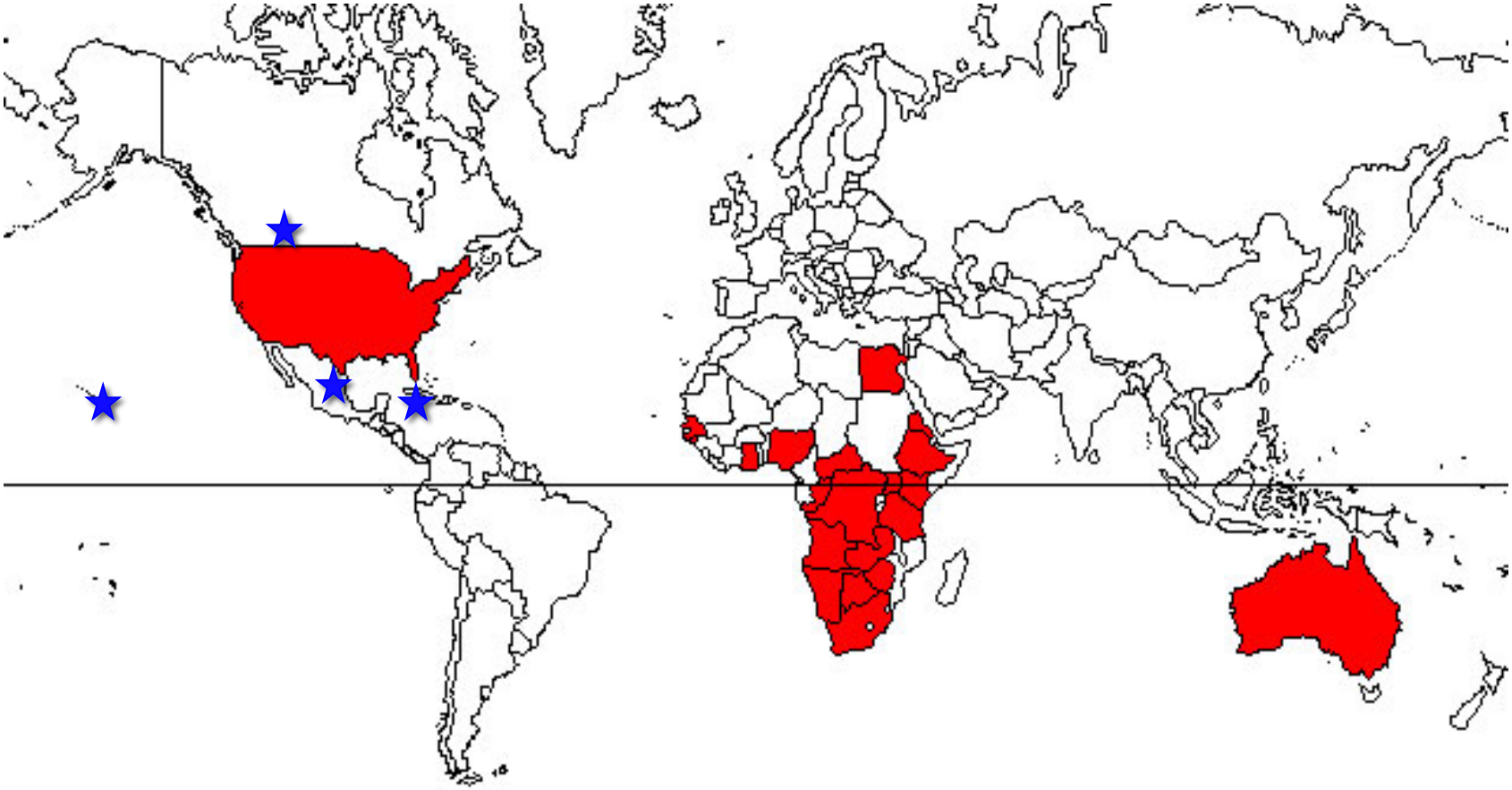
- *When possible, rotate the use of miticides to reduce selection pressure as compared to repeatedly using the same product, mode or action or chemical class. If multiple applications are required, use a different mode of action each time before returning to a previously-used one.*
- *Base miticide use on Integrated Pest Management (IPM). This includes proper pest identification, monitoring for locality specific economic threshold and economic injury levels, record keeping, and utilizing all available control practices (cultural, biological and chemical).*
- *Maximize efficacy by following all label instructions including dosage and timing of application.*

Gilles San Martin

SMALL HIVE BEETLE

Biology and Management

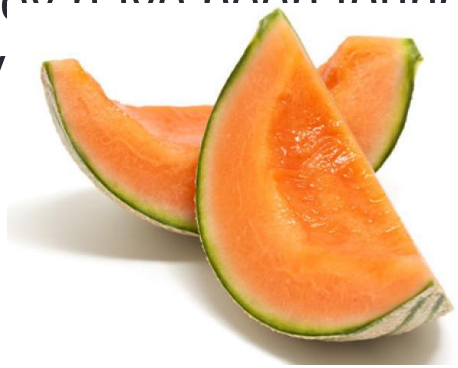
Introduction to the U.S.

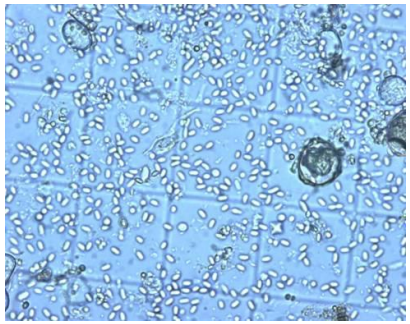



♂
2mm

What we know

- SHB are opportunists, cohabitating with honey bees. They can also live on fruit, but reproduction is poor.
- SHB have not been observed living in any other natural environment, even in their native South Africa.
- Beetles are establishing in the cold northern states.
- They have been found to vector AFB and nosema spores between hiv





What we know

- SHB carry a **yeast** (*Kodamaea ohmeri*) on their bodies which inoculates pollen and honey and produces a **kairomone** to attract other SHB.

Kairomone: A chem… …pecies that benefit… a differen…

Kodamaea ohmeri

…it food … …palpating … …s … their a… …pburn 200…

- Adult SHB overw…ter … …ny cluster.

3-methyl-butanol → Isopentyl acetate

- Adult SHB can migrate in a swarm of honey bees.

The larva is the damaging stage of small hive beetle!

…so don’t freak out if you see only adults in your hives.

Just keep an eye out for

these

Nooooooo!!!

SHB larva damage: ‘Before’ and ‘After’

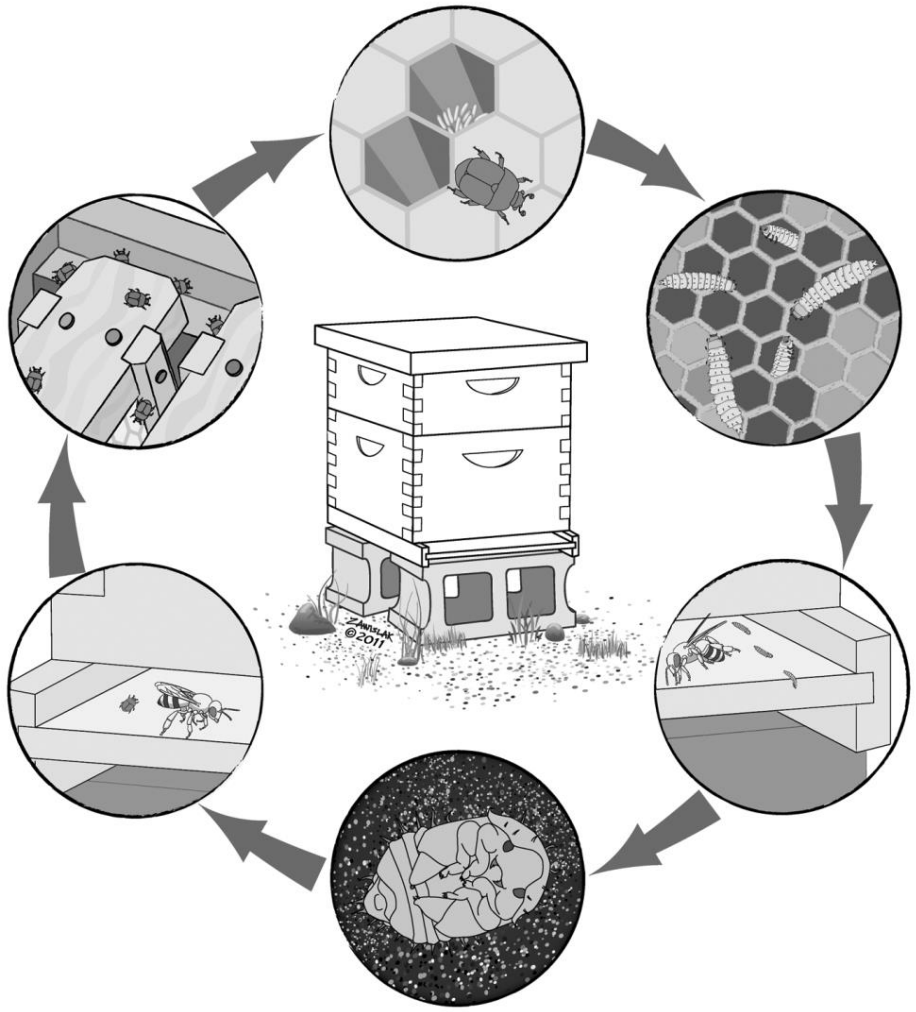
Food sources for adult and larvae are honey, stored pollen, bee brood, pollen patties and grease patties.

Wax moth vs. hive beetle

Small Hive Beetle Life Cycle	
Developmental Stage	Duration*
Egg	24 to 48 hrs.
Feeding Larva (L1-L3)	4-5 days
Wandering Larva (late L3)	1-2 days
Pupa	21 days
Adult	6 to 18 mos.
***Averages under optimum conditions. Actual development time varies with temperature and humidity.**	

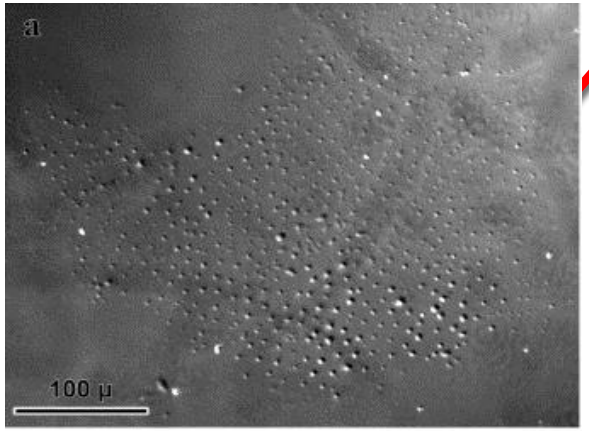
A new generation of beetles is produced every 30 days!

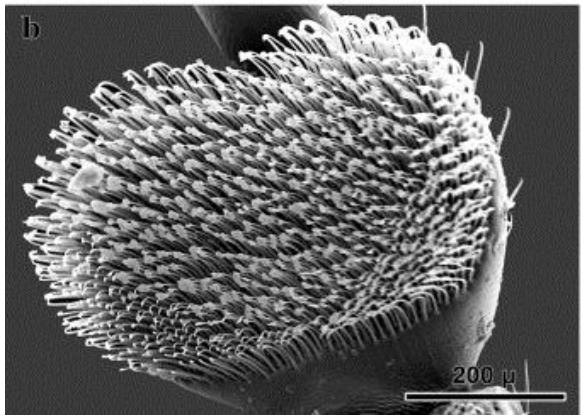
Small Hive Beetle Life Cycle



Hive beetle defenses

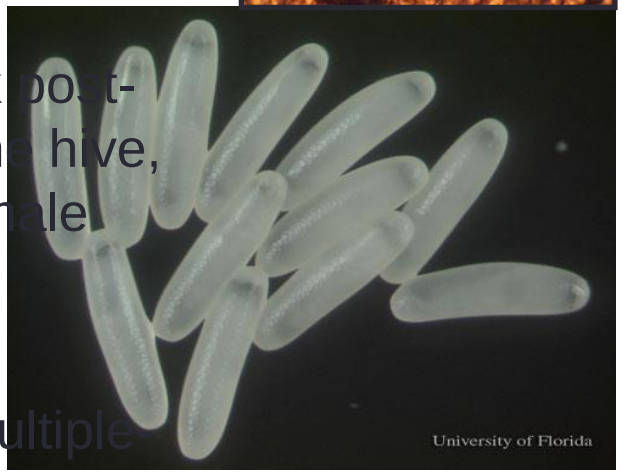
Adults are not susceptible to honey bee aggression due to a **limuloid** defense posture and **fine hairs** that cover their bodies. They also secrete an oil from their **tarsal pads** that allows them to adhere quite firmly to a smooth surface.





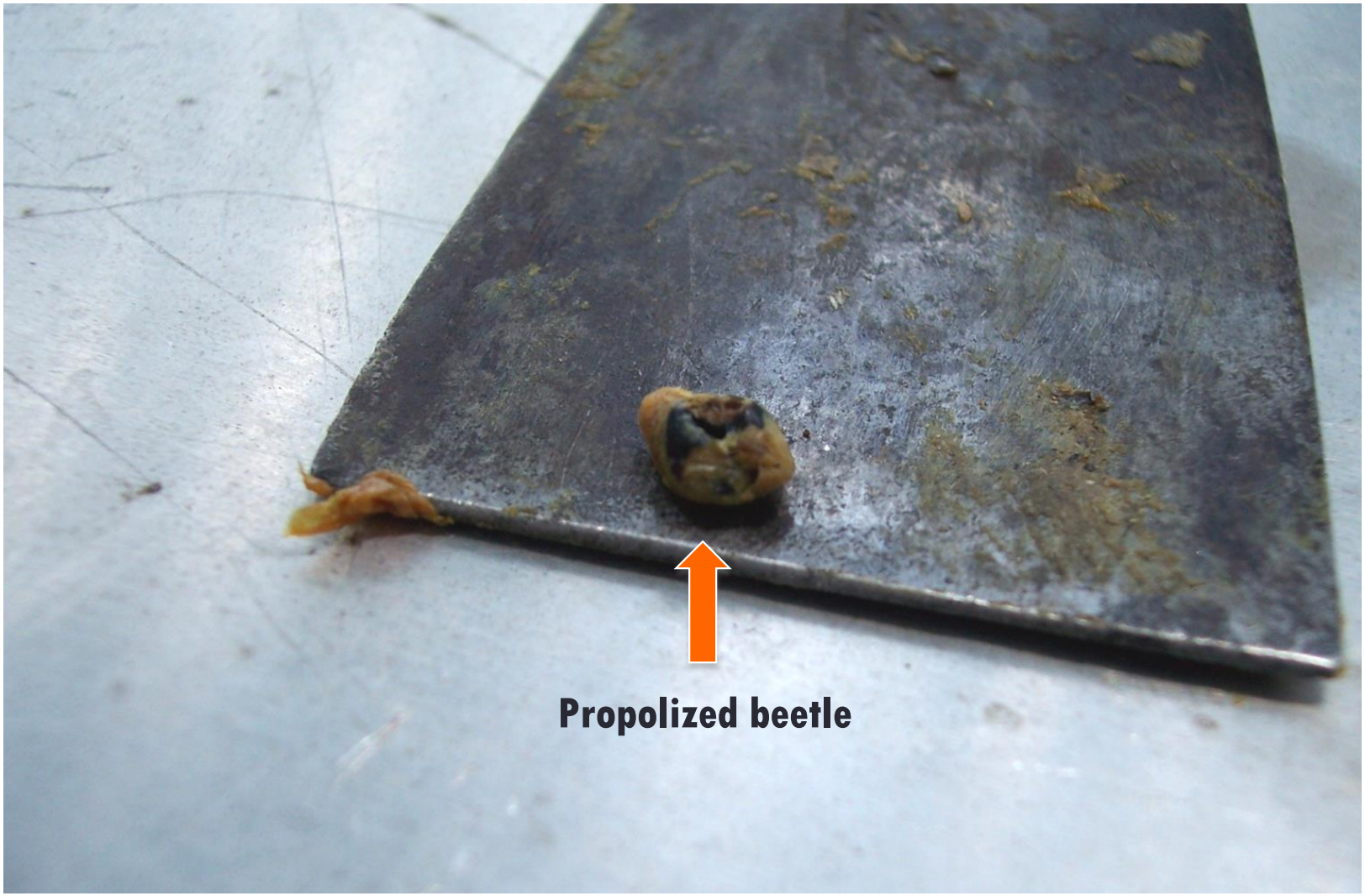
Reproduction

- Females live >6 months and can lay about 1,000 eggs.
- Eggs look very similar to honey bee eggs, slightly smaller and laid in clusters.
- Adults are sexually mature about 1 week post-emergence. Mating may occur outside the hive, but egg-laying can not begin until the female takes a meal.
- Researchers have observed that SHB multiple mate, but little is known about mating behavior.



Honey bee defenses

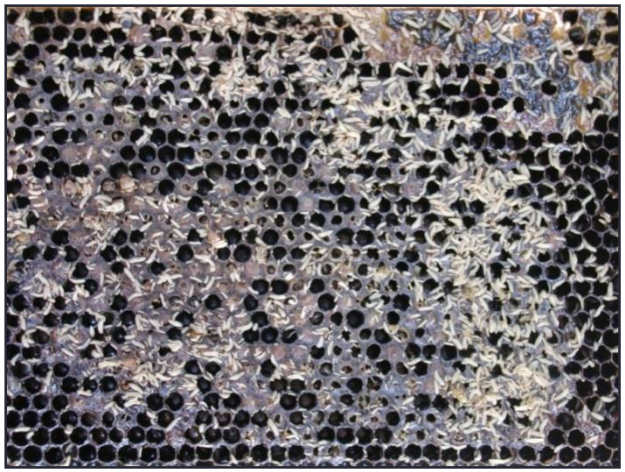
Honey bees have not developed an effective mechanism by which to control SHB. Options are limited to **corralling** and **propolizing** adults, and **chewing** larvae and eggs.


Propolized beetle

Good Hive Management is **ESSENTIAL**

If beetle pressure becomes too great, bees will ABSCOND!

Ten Best Management Practices



1. Remove dead out colonies!

Ten Best Management Practices

2. Remove propolis or corals!

Ten Best Management Practices

3. Keep colonies strong.

4. Maintain queen-right colonies only; queenlessness will attract beetles.

Ten Best Management Practices

5. Do not add supers or put brood on top supers if bees cannot take care of them.

6. Place colonies under the sun.

Ten Best Management Practices

7. When feeding colonies with pollen supplement, provide just enough patties to be consumed in two days.

8. Keep in-hive feeders and bottom boards clean.

Ten Best Management Practices

9. Keep honey houses neat and clean. Store frames with pollen and brood in a freezer.

10. Extract honey within 1-2 days before massive hatching of eggs occurs.

Would you ever say that the Turkey Vultures killed this deer?

Why do some insist that the SHB kills the majority of colonies that it overruns?