What Are the Bees Telling Us?

A Brief Overview of Honey Bee Behaviors & How to Interpret Them

What We Aren't Covering Now

"Out & About" Behaviors

- Swarm Behavior "in the open"
- Mass Stinging Attacks
- Scout Bees, Scouting for Nest Sites
- Foraging, Forage Scouts
- Pollination Efficacy, nut set, seed set
- Pesticide Exposure
- Mistakes Bees Make
- Mistakes People Make (like fingernail polish)
- Preventing Unwanted Bees (structures)
- Staying Safe from Bees
- Deterring unwanted pollination (seeds in seedless fruit)

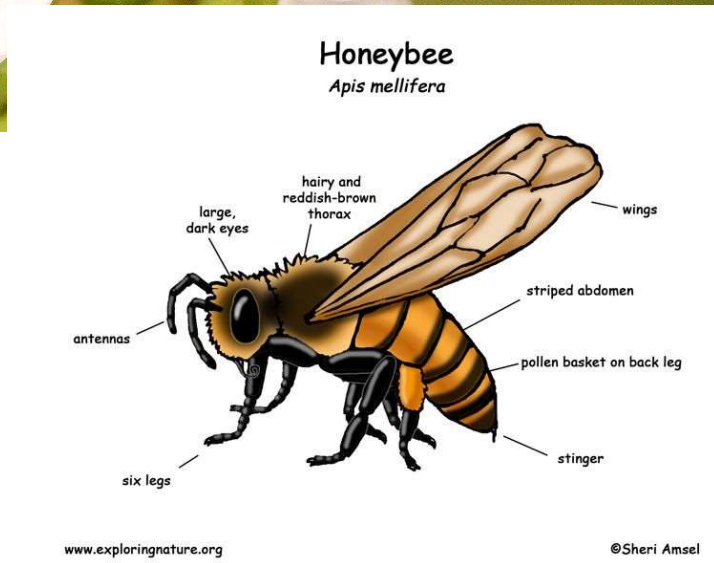
What's Going on Here?

Observation:

- Pollen forager entering hive with partially-full pollen baskets
- No incoming pollen

Interpretation:

- No open brood
- Possibly queenless



What's Going on Here?

Observations:

- Some cells fully capped
- One cell is almost fully capped
- Very young larvae
- Some cells never yet held brood
- Some cells held several prior brood cycles
- Well-proportioned larvae
- Mixed ages, side-by-side

What's Going on Here?

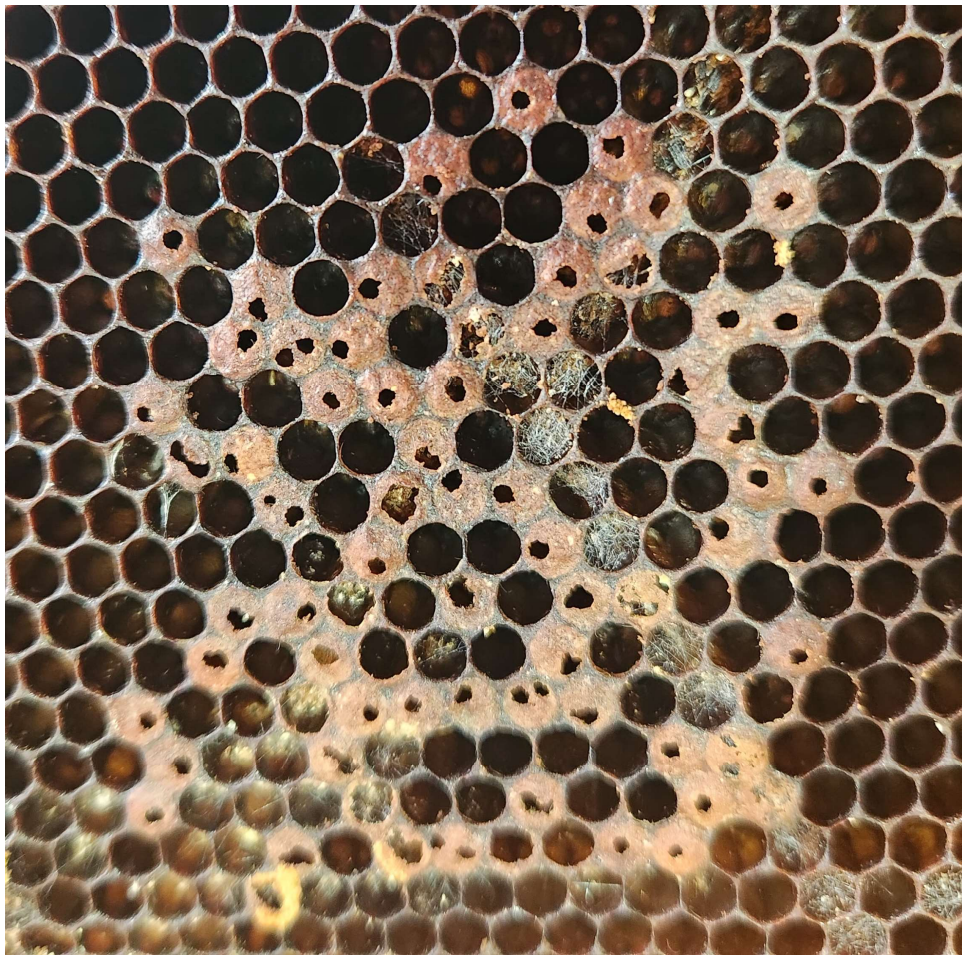
Interpretations:

- Capped cells nicely domed. ☺
- A cell is almost fully capped ☺
- Very young larvae ☺
- Some cells never yet held brood (just FYI)
- Some cells held several prior brood cycles (just FYI)
- Well-proportioned larvae ☺
- Mixed ages, side-by-side ☺?💀?

What's Going on Here?

Observations:

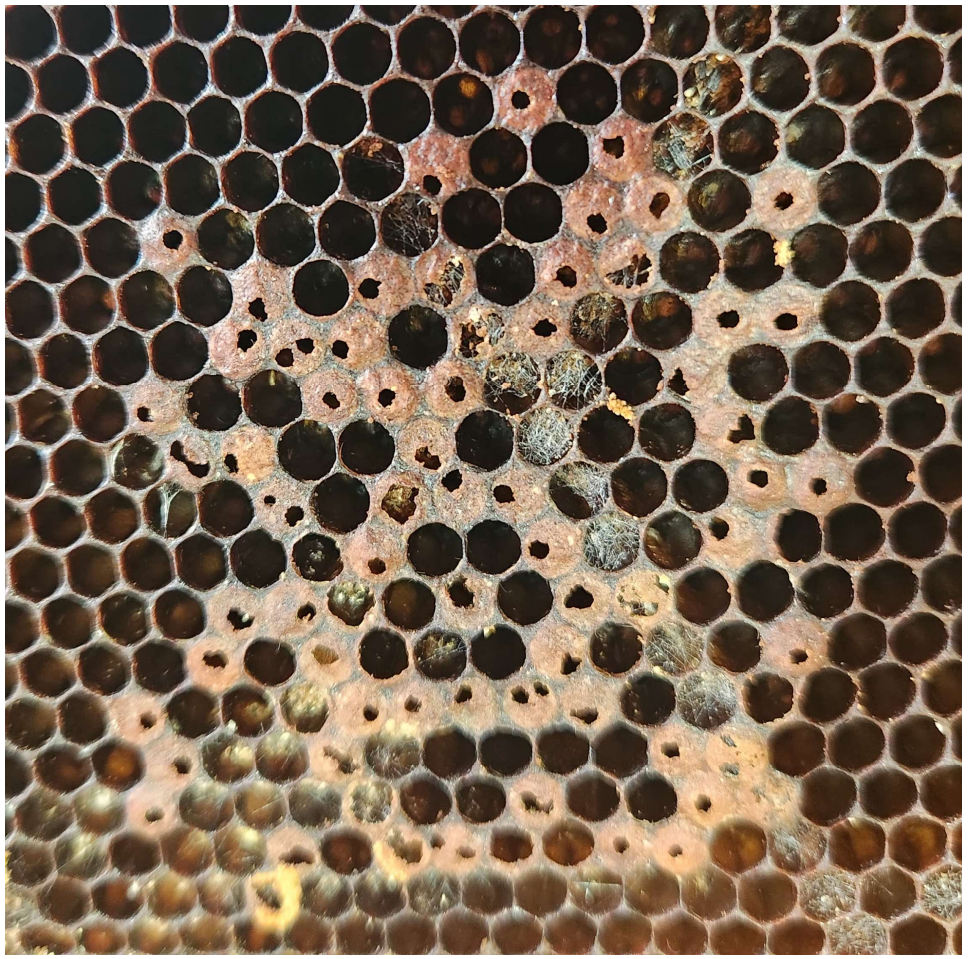
- Brood is all dead
- Pinholes in cappings
- Cappings are sunken
- Wax worms eating combs
- Comb is old, dark



What's Going on Here?

Interpretations:

- Nurse bees poked pinholes to check on brood
- Hive failed before nurse bees removed failing pupae
- Wax worms began eating combs before beekeeper intervened
- Wax moth action curtailed by freezing
- Old, dark comb: cull this frame
    - Due to age AND dead brood content (don't save/re-use)



What's Going on Here?

Observations:

- Bees died young, still very fuzzy
- Wings are deformed
- Other physical features seem intact

What's Going on Here?

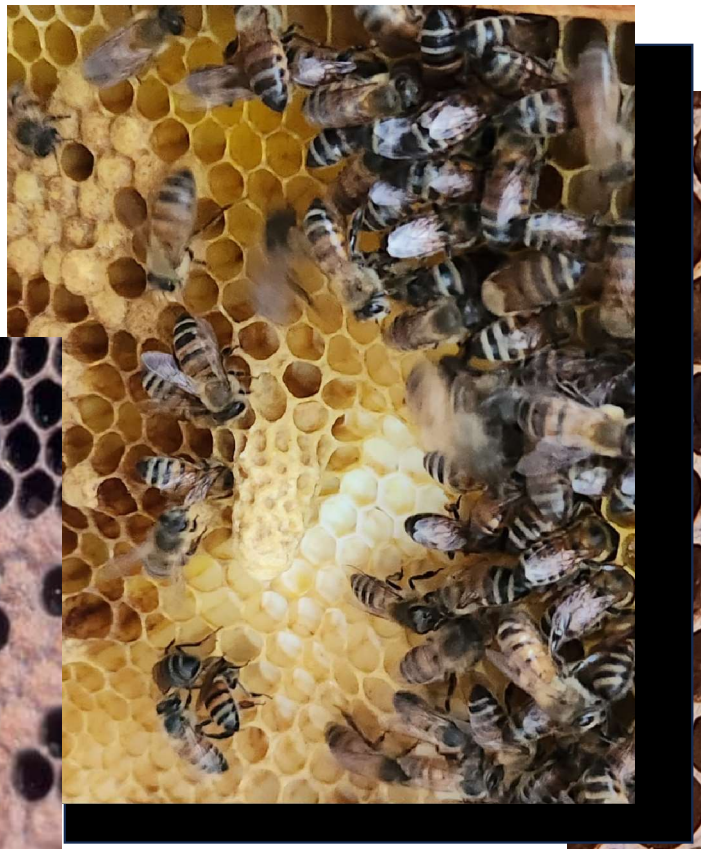
Interpretations:

- Deformities due to development, not injury
- Virus affected development during pupation, not larval stage
- Likely due to Deformed Wing Virus, vectored by mites
- Correlate this with mite count

What's Going on Here?

Observations:

- Queen cells, ripe
- One is torn open
- Middle of the comb



What's Going on Here?

Interpretations:

- Torn-open cell, killed by rival queen that emerged earlier
- Queen cell on middle of frame is typically an emergency queen, rather than supersedure queen
- Queen cell at edge or bottom is typically a swarm cell
    - Planned, prepared, high-quality queen

What's Going on Here?

Observations:

- Queen cell is full depth
  - Not just a "cap"
- Exit is "flat" (planar)
  - NOT ragged

What's Going on Here?

Interpretation:

- Virgin queen emerges via flat, planar exit "manhole"
- After emergence & after death of rival, workers clean up & tear down queen cells

What's Going on Here?

Comparing queen emergence to worker emergence

What's Going on Here?

Observations:

- Bees fanning near entrance
- Feet firmly planted
- Wings not visible
- Mostly pointed same way
- Foragers avoiding them

What's Going on Here?

Interpretations:

- Different situations
  - Cooling, convection
  - Cooling, evaporative
  - Signaling
    - Alarming
    - "Homing beacon"
- Normal colony behavior
  - No need to be alarmed
- Ensure adequate water!

What's Going on Here?

Observations:

- Bees are alive, but motionless
  - Tightly clustered
  - Legs interlocked (sometimes)
- Bees "revive" later on
  - Sometimes later in the day
  - Sometimes after many days

What's Going on Here?

Interpretations:

- This is a normal winter cluster
- If bees are motionless (or hardly moving) this is torpor
  - Similar to estivation/hibernation
- Not so likely in Sonoran Desert

What's Going on Here?

Observations:

- Dirty footprints (speckles)
  - At landing board or any exit
- Scraps of honeycomb
  - On landing board
  - On bottom board
- Dextrose crystals
  - Lying around…
- Grappling
  - At any entrance
- Ants entering, exiting

What's Going on Here?

Interpretations:

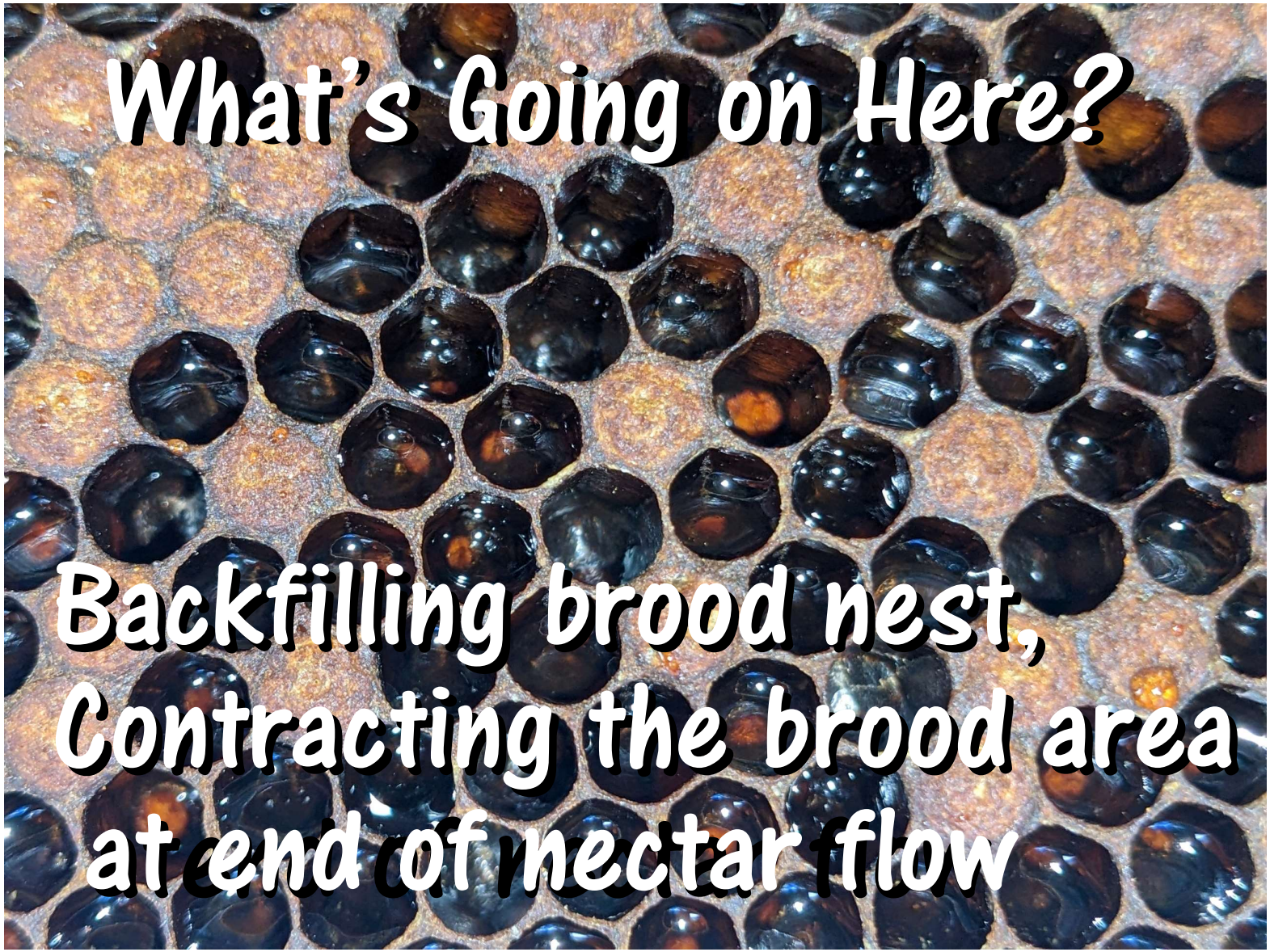
- Dirty footprints (speckles)
  - Robbers wiping feet while exiting
- Scraps of honeycomb
  - Frantic robbers focusing on liquid honey & quick departure
- Dextrose crystals
  - Discarded solids, focusing on honey
- Grappling
  - Guard bees sending attackers back with a message "do not mess with us"
- Ants won't be able to exploit a strong hive

Potential Signs of Robbing Observations:

(many of these behaviors are common when robbing ISN'T happening)

- Bees grappling at entrance
- Bees hesitantly approaching hive entrance
- Bees climb up exterior of hive to depart
  - Some struggle to take off from side wall
- Bees departing AFTER sundown
  - (because they know the way home)


What's Going on Here?


What's Going on Here?
Backfilling brood nest,
Contracting the brood area
at end of nectar flow

What's Going on Here?

Observations:

- Light colored, fuzzy bee
- Crust on rim of cell
- Plump, proportionate larvae

Interpretation

- Newly-emerged adult AKA "fuzzy"
- "Crust" =waxmoth eggs
- Healthy-looking brood

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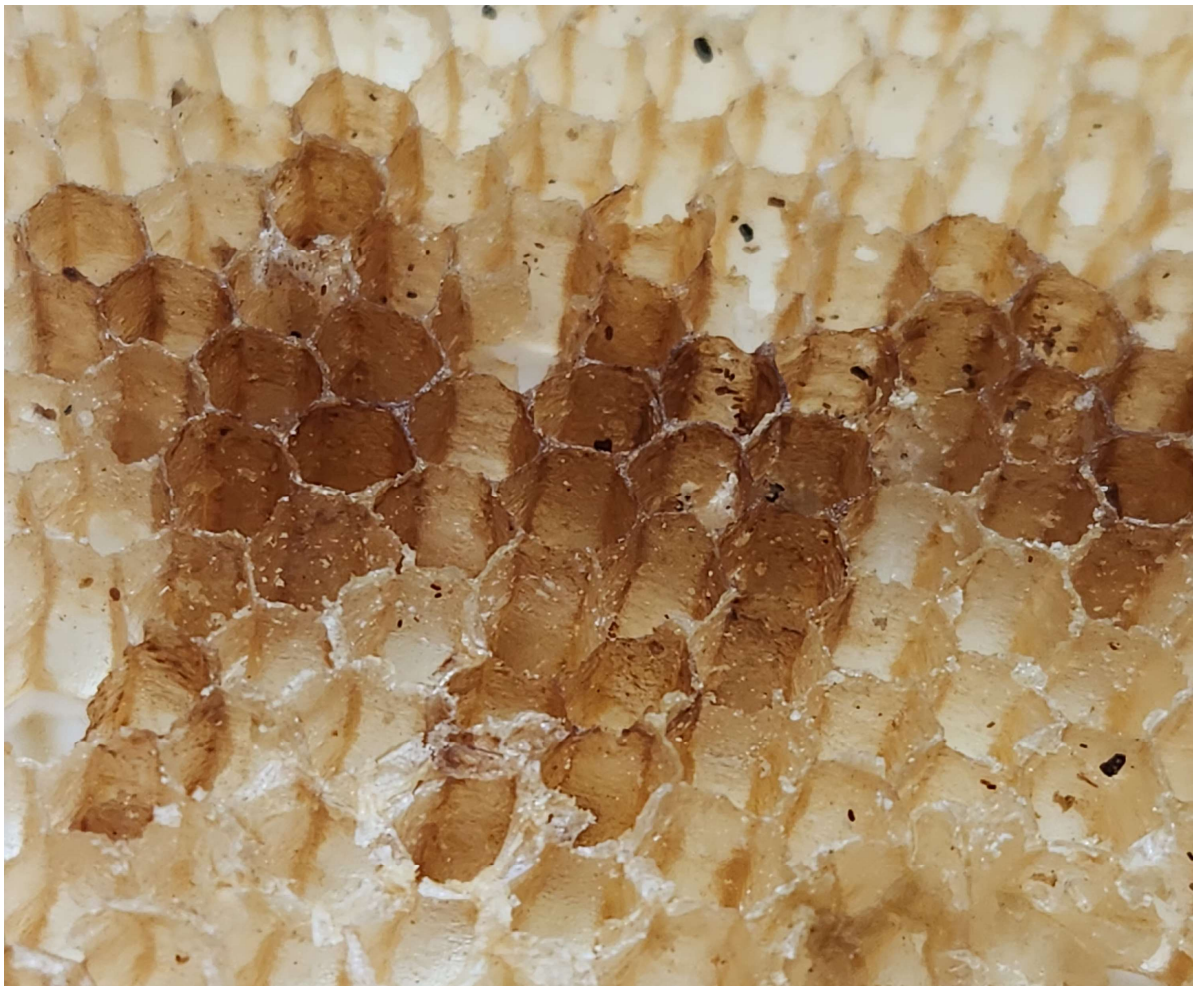
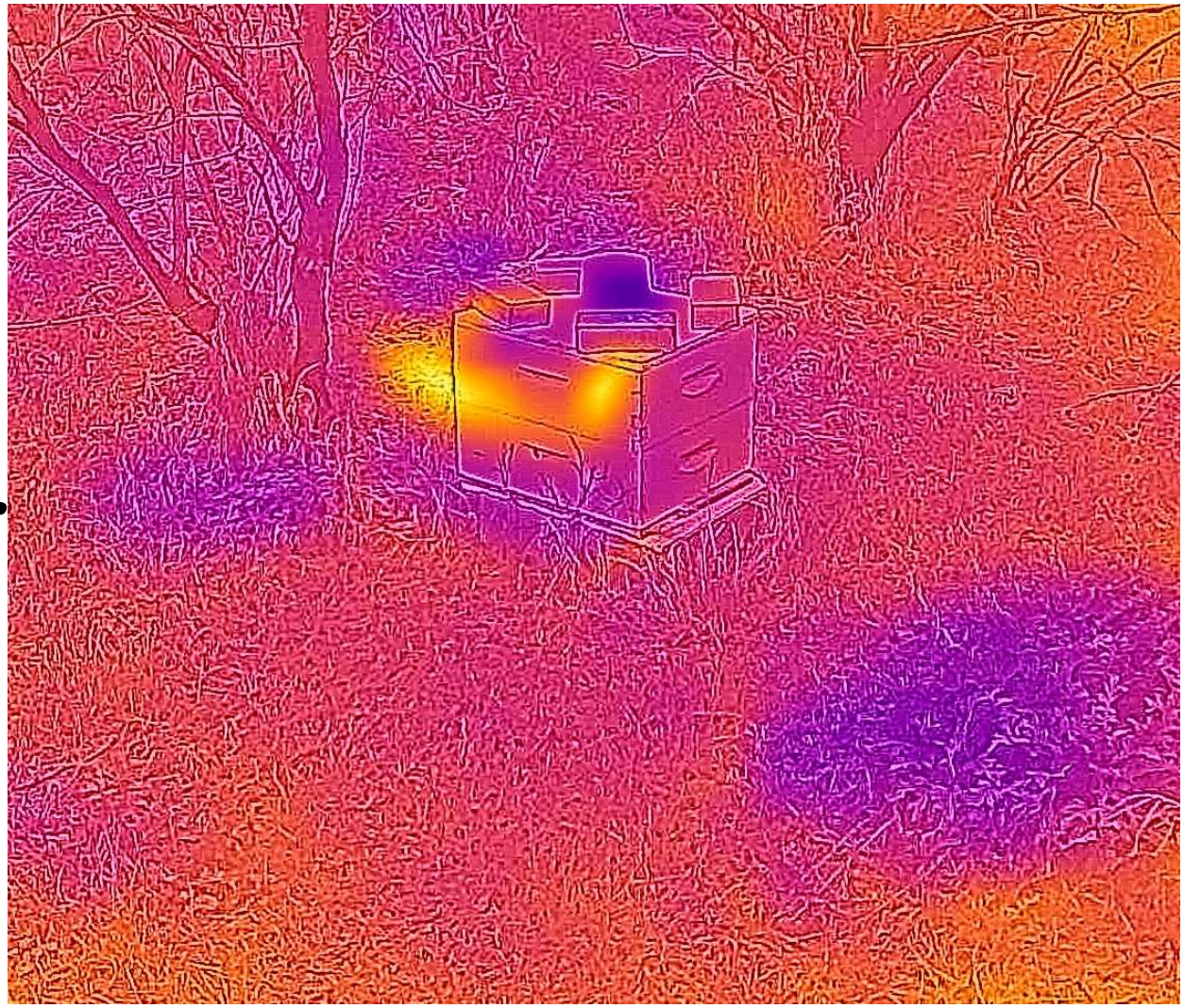


Live? Dead-out?

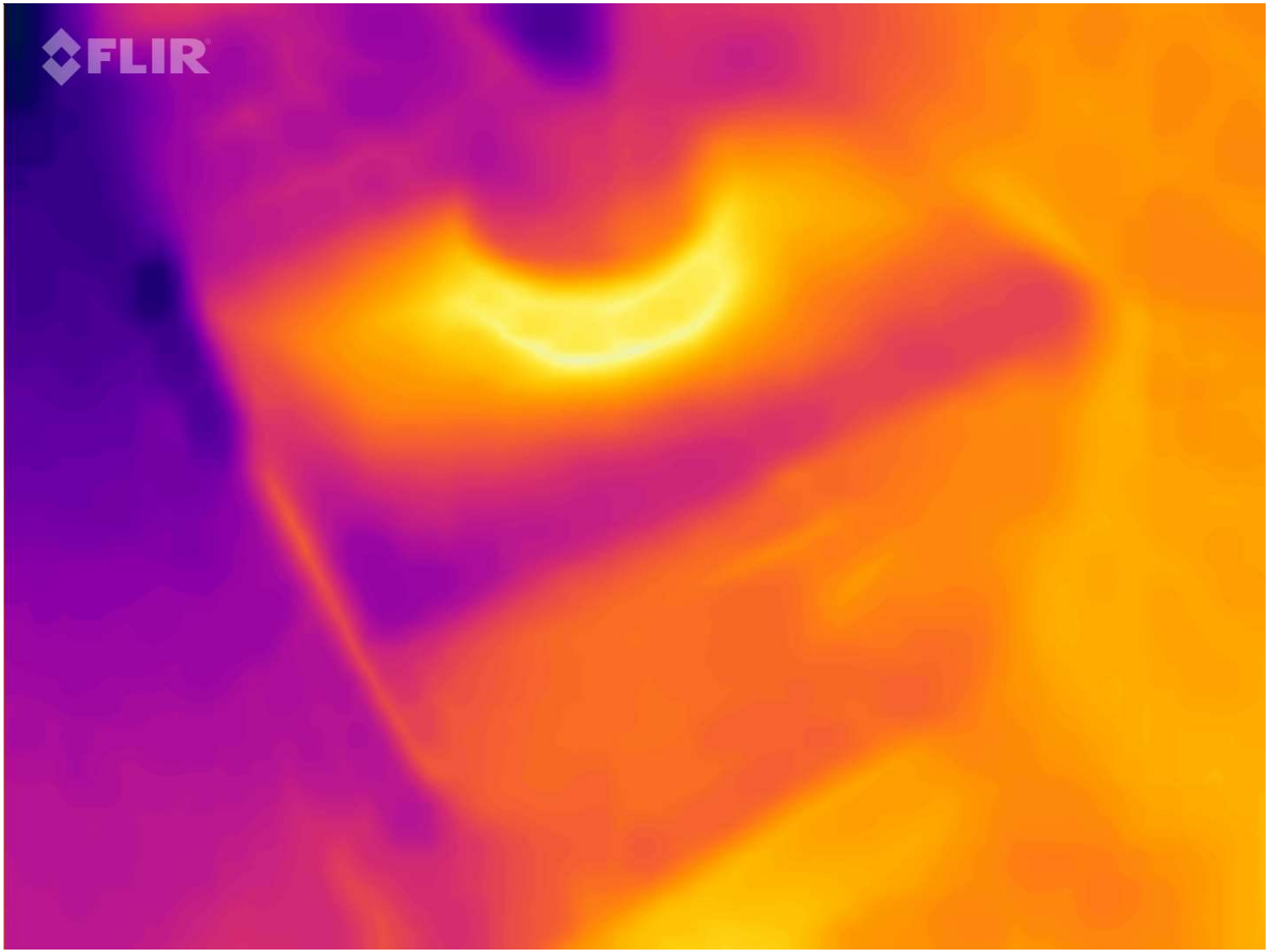
Too cold for bees to fly.
Too early in the day.

Living, thriving!

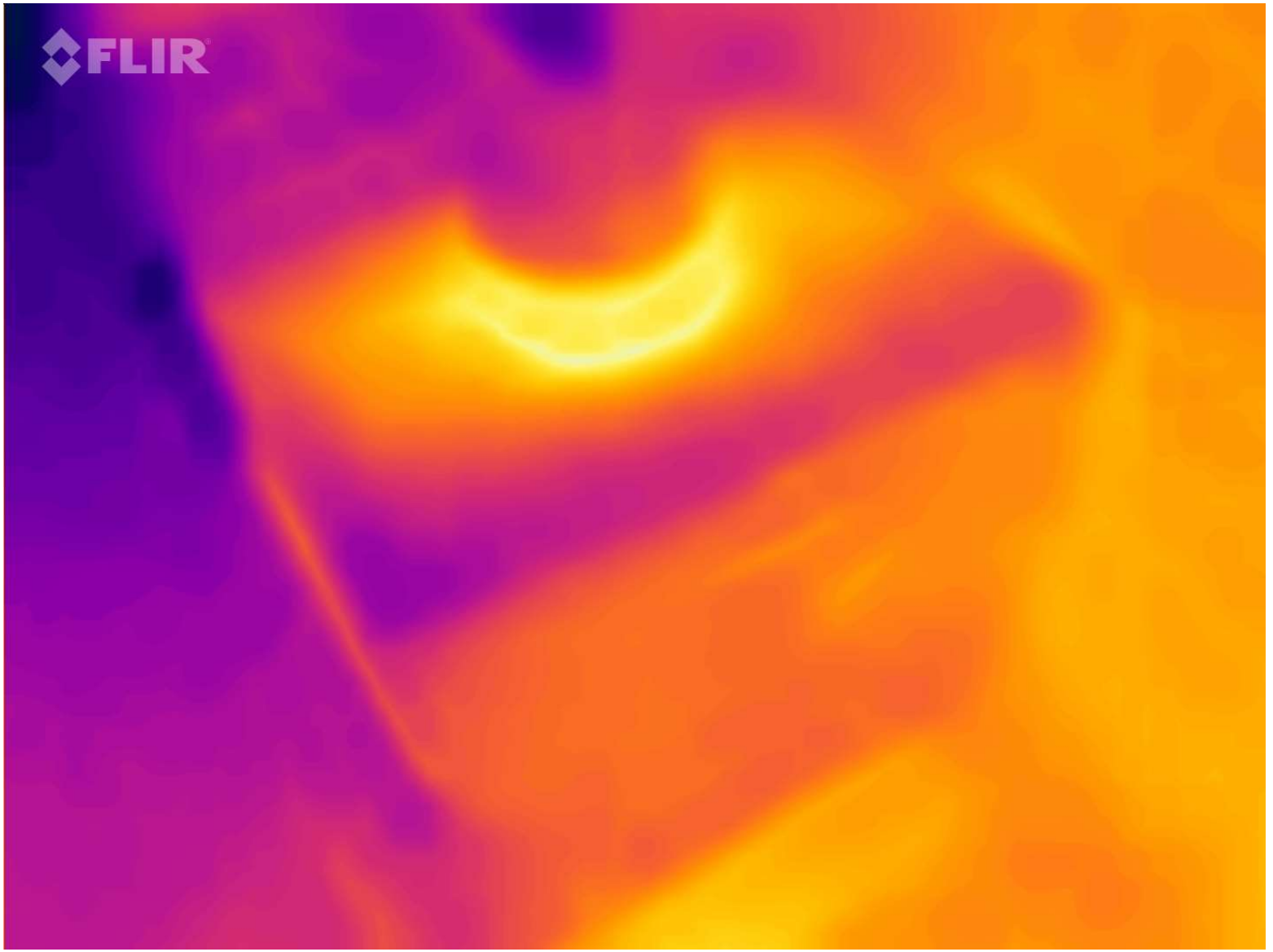
A. Received feeder a week ago
B. Heat signature, upper & lower box



Why is feeder bucket so warm?



Heat from colony is warming remaining liquid.



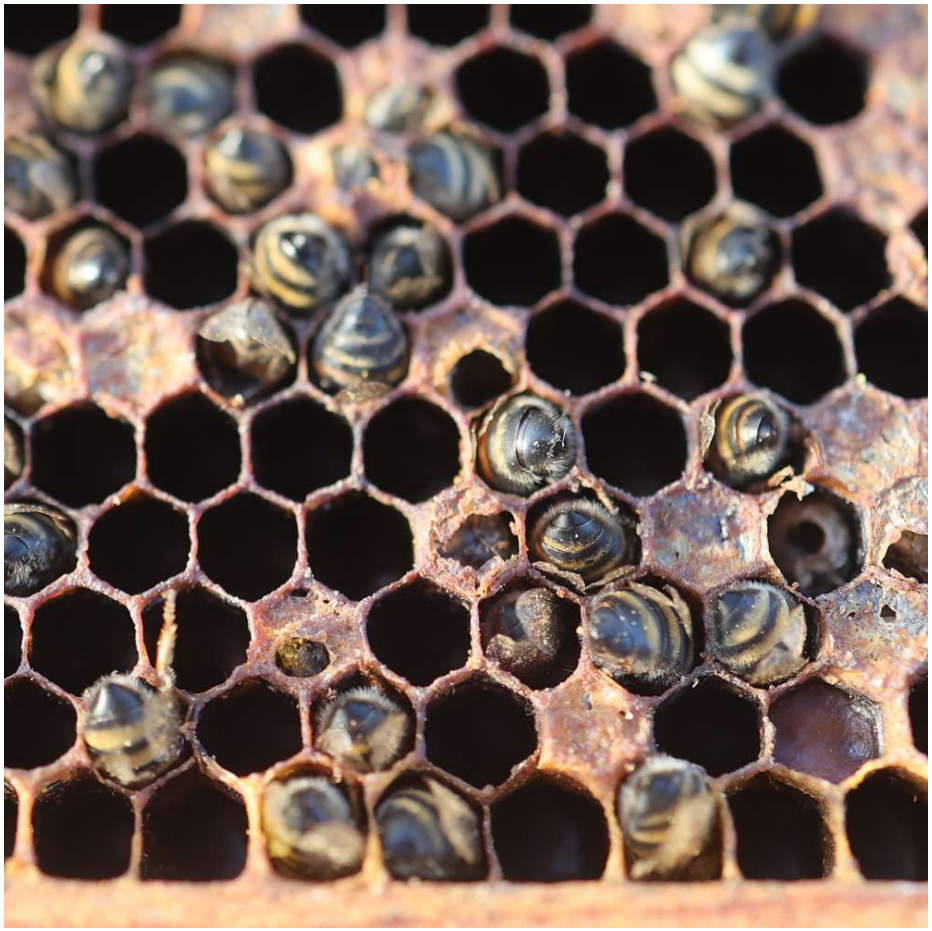
Beekeeper's "worst problem"

Varroa *destructor*

Chemical-free countermeasure:

Because varroa preferentially propagates on drone larvae, pulling capped drone frames can reduce varroa load.

What's Going on Here?



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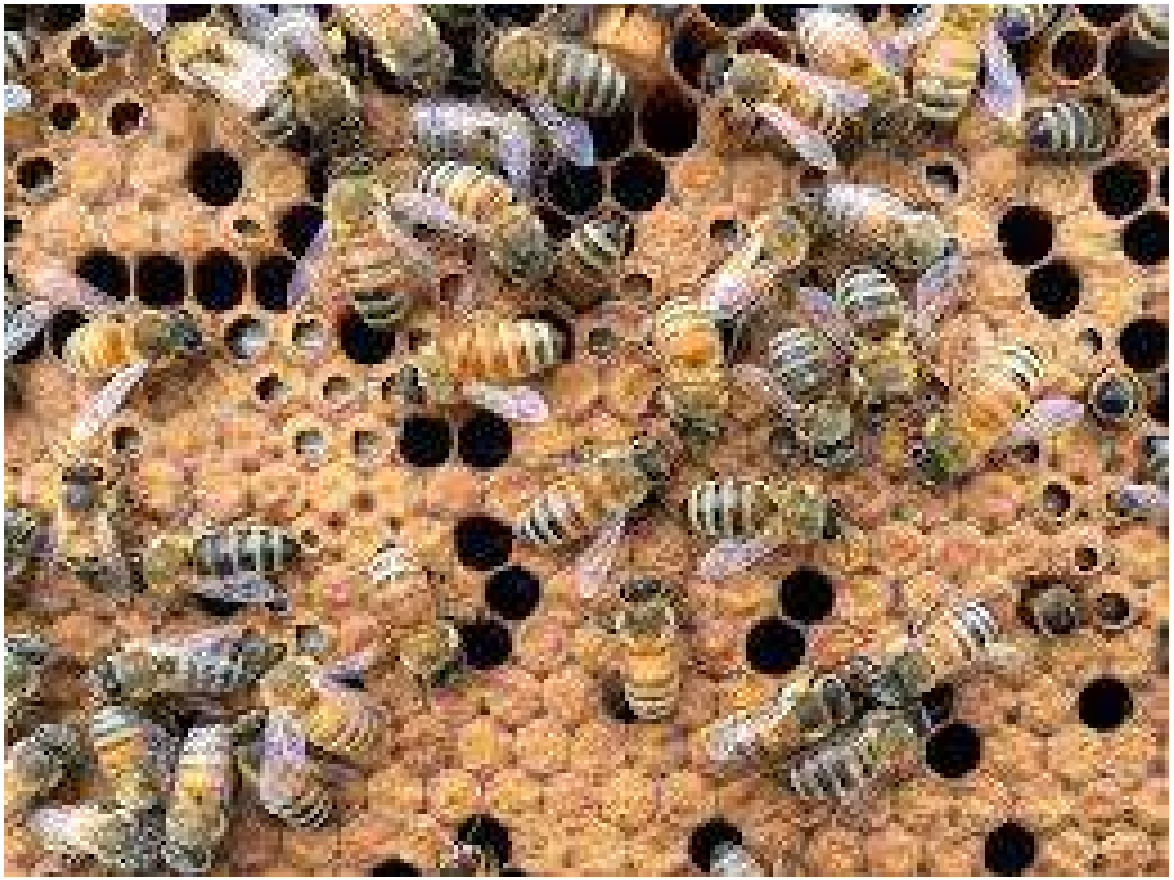
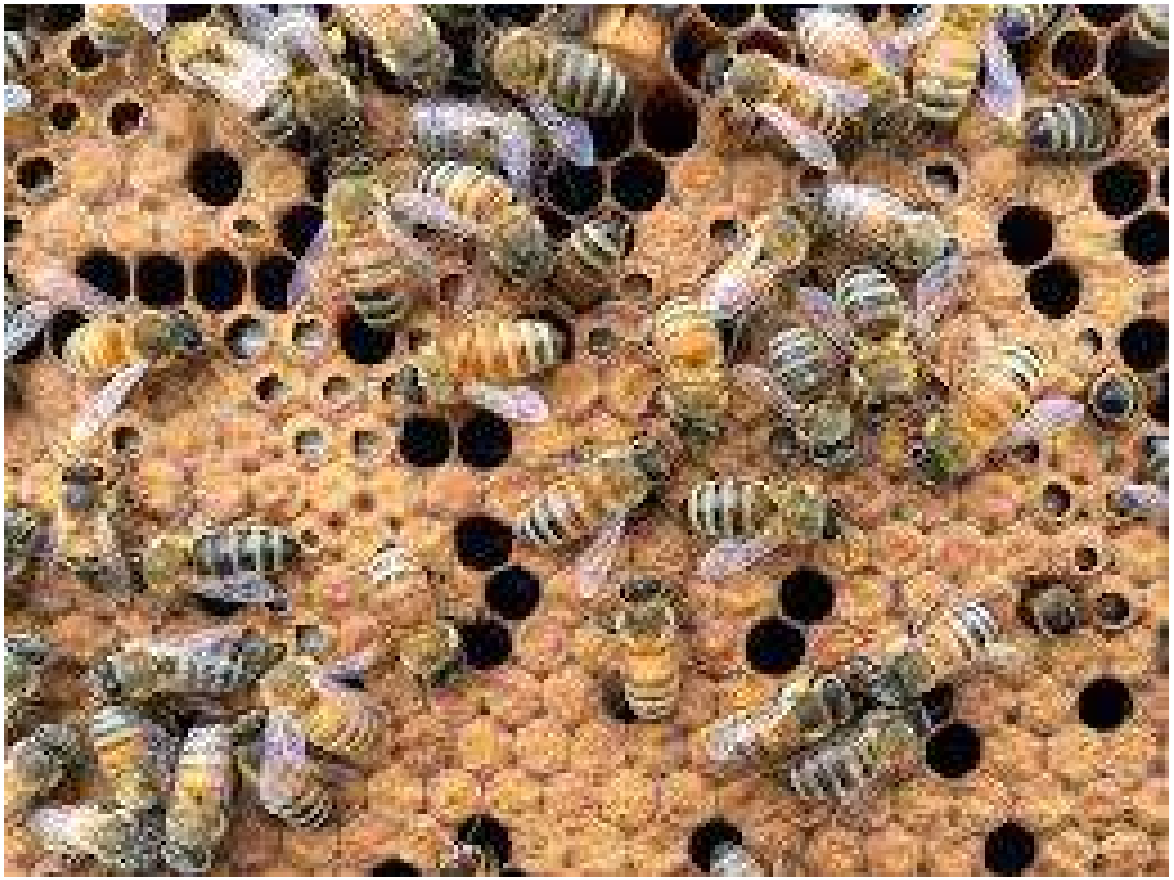


What's Going on Here: Bald Brood



Introducing Wagon Wheel Ranch

- Founded 1911 by John E Denker
- Producing bees & hive products
  - Honey bees for beekeepers
    - Nucleus Colonies (“nucs”)
  - Honey
    - Retail jars
    - Honey Sticks
    - Comb honey
    - Private label (e.g. gift shops, gift baskets)
  - Pollen
  - Beeswax
  - Sauces
    - Honey Only™ Mesquite Barbecue Sauce
    - Honey Only™ Teriyaki Sauce
- No longer offering pollination services
- We don’t sell queens (but we do sell nucs)

Introducing Wagon Wheel Ranch

Apiary Owned & Managed by

Wagon Wheel Ranch

AZ State Land Apiary Permit KE-117043

(520) 780-1831

Questions@WagonWheelRanchArizona.com

Introducing Wagon Wheel Ranch

Technical & Analytical Capabilities

- X-band radar for categorizing bee flight
- Ion-emission spectrometer
  - Identify heavy metals down to 2 ppm
- Optical refractometer
  - Assessing sugar/water content
- X-ray scanning
  - Sanitation & quality control
- Digital microscopy in excess of 1200x

Needs

On-site water filtration/distillation
Process-Water recycling
Rainwater harvesting
Solar electrical
Dedicated water tank truck

Production Capabilities

- Woodshop
- Welding shop
- Paint shop
- Portable welding: gates, fences, shade structures
- Auto shop
- Extraction of honey supers
- Bottling
- Low shear screening for 600 micron cleanup
- Wax processing
- Freezers for comb, etc.
- Concreter mixers
- Rotary tillers
- Bobcat loader & forklift

Introducing American Bee Control

- Founded 1968, Tucson, Arizona
- 100% Live Relocation (no-kill processes)
- No location too difficult
- Residential, Commercial, Government
- Full, same-day repair of each structure
  - but we don't provide painting
- Insured to $2 million

Services include:

- Established Hive cut-outs
- Swarm trapping
- Swarm Pickup
- Trap-outs: inaccessible spots
- Bee deterrence ("bee-proofing")
- Consulting/Evaluation

Approved Vendor/supplier:

- Pima County
- City of Tucson
- State of Arizona
- AURA (Astronomy Telescopes)
- US GSA (General Services Admin)

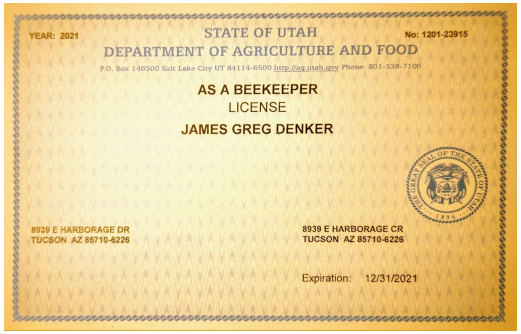
Affiliations: Wagon Wheel Ranch & American Bee Control

- American Honey Producers Association® (Commercial Member)
- American Beekeeping Federation®
- Better Business Bureau of Southern Arizona® (A+ Accredited)
- Southern Arizona Beekeepers Association (Life Membership)
- National Wildlife Control Operators Association®
- Licensee: Arizona Grown® (Arizona Department of Agriculture)
- Arizona State Apiary Permit (Arizona State Land Department)
- Licensed Utah Professional Beekeeper (Utah Dept of Food & Ag)
- Arizona Small Business Association®
- Pollinator Stewardship Council® (“Champion Supporter”)

Affiliations

Southern Arizona Beekeepers Association

Arizona GROWN



UDAF

Arizona State Land Department — Natural Resources — 1915

asba arizona small business association

BBB ACCREDITED BUSINESS

BBB Rating: A+

ABF 1943 American Beekeeping

Pollinator Stewardship Council

National Wildlife Control Operators Association — NWCOA — Competence Integrity Service

AHPA American Honey Producers Association

"Honey Bee Version of ASHRAE 62.2"
or
"How Bees Survive Heat, Cold, Wind & Darkness"

A quick look at the beehive's maintenance of humidity, temperature, CO_2 and hygiene.

By J. Greg Denker

A B C American Bee Control
(800) 211-6683
www.AmericanBeeControl.net

American Bee Control

Wagon Wheel Ranch

Wagon Wheel Ranch of Arizona

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JD1

American Society of Heating, Refrigeration & Air Conditioning Engineers

[illegible]intenance of humidity, temperature,

Wagon Wheel Ranch of Arizona

Slide 48

JD1 JG Denker, 3/12/2024

Mechanisms of Environmental Stabilization

- Fanning*
- Evaporation
- Exothermic Chemical Reaction
- Airflow re-direction
  - Ducting
  - Fluid amplification
- Airflow modulation
  - Adding/subtracting fanners
  - Increasing/decreasing fan speed
- Humidification
- Surface adhesion
- Top-down Construction
- Careful spacing and alignment
- Housekeeping
  - Dust and fiber removal
  - Pest removal
  - Fraternal grooming
- Torpor (in very cold conditions)
- Population re-positioning
  - "Bearding" externally
  - Clustering, internally

* Not same as "signalling" or "alarming"