

NEW BEEKEEPER TRAINING
MANAGED MENTORING

Sunshine Hill FARM LLC

Sunshine Hill Farm, LLC

Wax and Wonky Comb | October 24th, 2026

DFW Area Beekeepers Conference
2026 North Texas Bee Clubs



OCTOBER 24, 2026

Honeycomb

Understanding and Promoting Comb Construction

Bees building wax, Good comb construction, Avoiding Wonky Comb



INTRODUCTION – Kevin Inglin

15+ year hobbyist beekeeper – 15 to 20 hives

EAS Master Beekeeper

Past President – NWNJBA

Day Job > IT Administrator, Paper Strategies Inc.

Our Home Yard

www.bkcorner.com
THE Beekeeper's CORNER PODCAST


EAS
EASTERN APICULTURAL SOCIETY
BUCKS COUNTY BEEKEEPERS ASSOCIATION
BABA
boston area beekeepers association
NORTHERN LIGHTS BEEKEEPING
2023 WAS/CDBA Conference, Calgary
APICULTURAL SOCIETY OF WESTERN AMERICA
W.A.S. NORTH
NORTHWEST NEW JERSEY BEEKEEPERS ASSOCIATION
NW
HIVE MIND
MWNJBA
SUSSEX COUNTY BEEKEEPERS ASSOC.
Susquehanna Beekeepers Association
Maryland State Beekeepers Association
Dedicated to beekeeping since 1908
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TRINITY VALLEY BEEKEEPERS ASSOCIATION
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Helping Beekeepers Be Successful
Essex County Beekeepers Society, Inc
LONG ISLAND BEEKEEPERS CLUB
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We're Capital Beekeepers!
PAWTUCKAWAY
beekeepers association
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BEEKEEPERS ASSOCIATION
Rock County Beekeepers
HUMBOLDT COUNTY BEEKEEPERS ASSOCIATION
JAN >
2027
The BEE 27 EXPO

MANAGED MENTORING PROGRAM

FOR GETTING STARTED IN BEEKEEPING

A free program for getting started in beekeeping. For clubs and new beekeepers.



Teaching beekeepers from scratch....
- I want bees, to bees in the box
- Bees in the box to box full grown
- Full grown to overwinter
- Start of season two and all that follows

Self-Serve Succinct Video Lessons
Supported with Online Meetings

Clubs can organize period in-person visits

www.managedmentoring.com

THE BEEKEEPERS CORNER PODCAST

THE VIBE IS TWO BEEKEEPERS MEET AT THE CORNER COFFEE PLACE



First episode – April 2010
305 Episodes and still going strong

Focus on hobby beekeeping topics, colony management and industry news coverage

Many interviews with prominent beekeepers over the years in the back catalog

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Kevin Moment

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HONEYCOMB
THE HEART
FACEBOOK
BEGINNING
BEEKEEPERS
HONEYCOMB
FORMATION
THE
FORMULA
HONEYBEES
BUILDING
WAX
THE
COMB
ZONE
PLASTIC
FOUNDATION
PROBLEMS
WONKY
COMB
BEST
PRACTICES

HONEYCOMB THE HEART

Honeycomb is the Heart of the Hive

- **It is literally the bee's home**
  - It serves as a place for their food storage
  - It serves as the vessel for the nursery
  - Comb factors in their overwintering ability
  - It plays a vital role in kin recognition within honeybee colonies
  - It enables chemical communication among colony inhabitants



Let's Examine Honeycomb



CONSTRUCTION

- How is honeycomb made?

CONDITIONS

- What conditions facilitate the creation of honeycomb?

BENEFITS

- The benefits and detractors to comb construction

Let's Examine Honeycomb



CONDITIONS

- What conditions facilitate the creation of honeycomb?

BENEFITS

- The benefits and detractors to comb construction

WHY WE CARE

- Why we should care about honeycomb as a resource

Let’s Examine Honeycomb



BENEFITS

- The benefits and detractors to comb construction

WHY WE CARE

- Why we should care about honeycomb as a resource

SETUP

- How can we setup the bees to make the best quality comb

Let’s Examine Honeycomb



WHY WE CARE

- Why we should care about honeycomb as a resource

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MANAGE

- In what ways should we manage our comb

Let’s Examine Honeycomb



SETUP

- How can we setup the bees to make the best quality comb

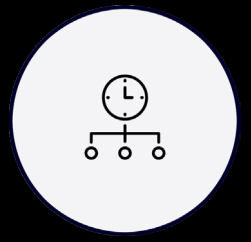
MANAGE

- In what ways should we manage our comb

NO WONKY!

- How do we avoid the dreaded wonky comb

Let’s Examine Honeycomb



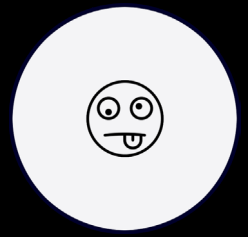
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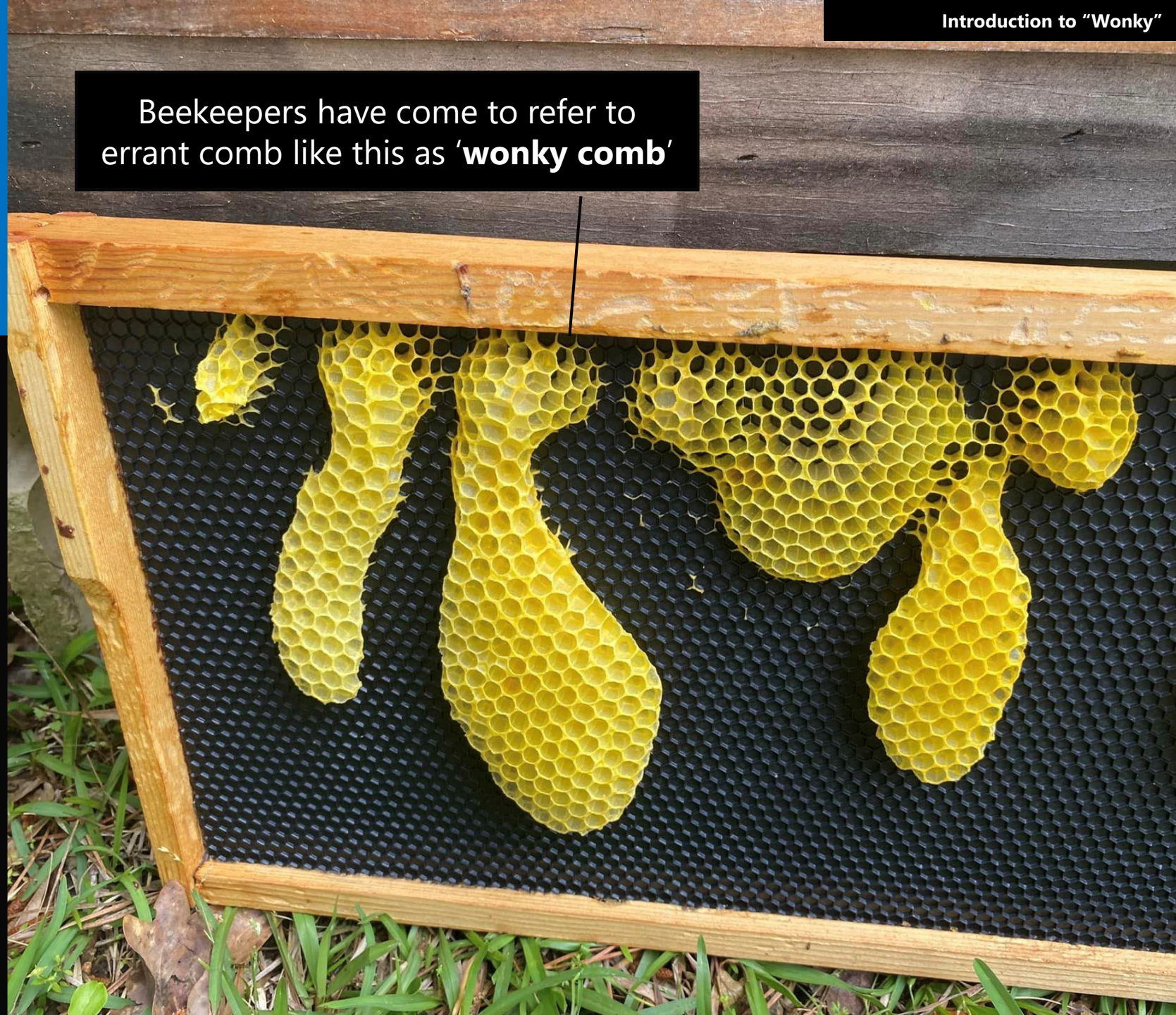
NO WONKY!

- How do we avoid the dreaded wonky comb

FACEBOOK BEGINNING BEEKEEPERS

This is terribly important in beekeeping

How can we avoid the dreaded Wonky Comb because it is a terrible way to start beekeeping





Every Year: Wonky Comb Problems Surface

HONEYCOMB FORMATION


Image credit: Black Mountain Honey Queen Rearing Video Screen Grab
To build comb: The factory must be in order

Hans G. Hornbostel

- Hans G. Hornbostel | German Scientist (1744)

FIRST TO RECOGNIZE THAT WAX DID NOT COME FROM FLOWERS

Up until that time the prevailing wisdom was that wax came from flowers

Hans G. Hornbostel

- Hans G. Hornbostel | German Scientist (1744)

HANS WAS THE FIRST TO DESCRIBE FLAKES ON THE BEES

He observed that worker bees carried wax scales and concluded they must have secreted them rather than collected them.

Hans G. Hornbostel

- Hans G. Hornbostel | German Scientist (1744)

HANS WAS THE FIRST TO DESCRIBE FLAKES ON THE BEES

This is the earliest documented scientific recognition that bees produce wax flakes (scales) from their own bodies

John Hunter

Someone that studies the physical structures of animals

- **John Hunter— British Anatomist and Naturalist (1792)**

Almost 50 years later

JOHN HUNTER PROVIDED ADDITIONAL CONTEXT

Hunter made the first attempt to define the origin of wax secretion, proposing it was an oily secretion produced by bees

BEESWAX PRODUCTION

Beeswax is made by young worker honeybees

- **The WAX GLAND COMPLEX (WGC), located bilaterally in the abdomen of worker bees**
  - The WCG is the secretory glands responsible for beeswax synthesis in honeybees
- **The peak period of WGC secreting beeswax is 10–18 days after a new bee emerges**
  - Once worker bees reach the age of 21 days, the glands begin to deteriorate with the secretion activity decreasing

BEESWAX PRODUCTION

Beeswax is made by young worker honeybees

- **Wax gland development is influence by nutrition**
  - Young workers need abundant energy and raw materials to grow the gland cells that will later secrete wax
    - During this developmental window, the glands undergo intense protein synthesis and high-energy metabolism, which requires strong food intake
- **Resource Scarcity**
  - Early in the season, when resources are scarce, **workers may emerge with underdeveloped wax glands**
    - Nature may not be supplying the nutrition needed to fuel proper gland growth
    - This can inhibit wax drawing capabilities early on

BEESWAX PRODUCTION

Beeswax is made by young worker honeybees

- **Not all bees will acquire functional glands at the same rates, and to the same extent**
  - There could be bees not engaged in wax making, but they do produce some wax from their glands and drop it in the hive
- **Wax creation is proportionate to colony size**
  - Larger colonies have more bees assigned to wax production

BEESWAX PRODUCTION

Beeswax is made by young worker honeybees

Wax is secreted as a liquid from four pairs of wax glands on abdominal plates on the underside of a bee's body

e liquid wax spreads
r the surface of these
tes, and, on contact
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scale

BEESWAX PRODUCTION

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The liquid wax spreads over the surface of these plates, and, on contact with air, it hardens, and forms a single wax scale

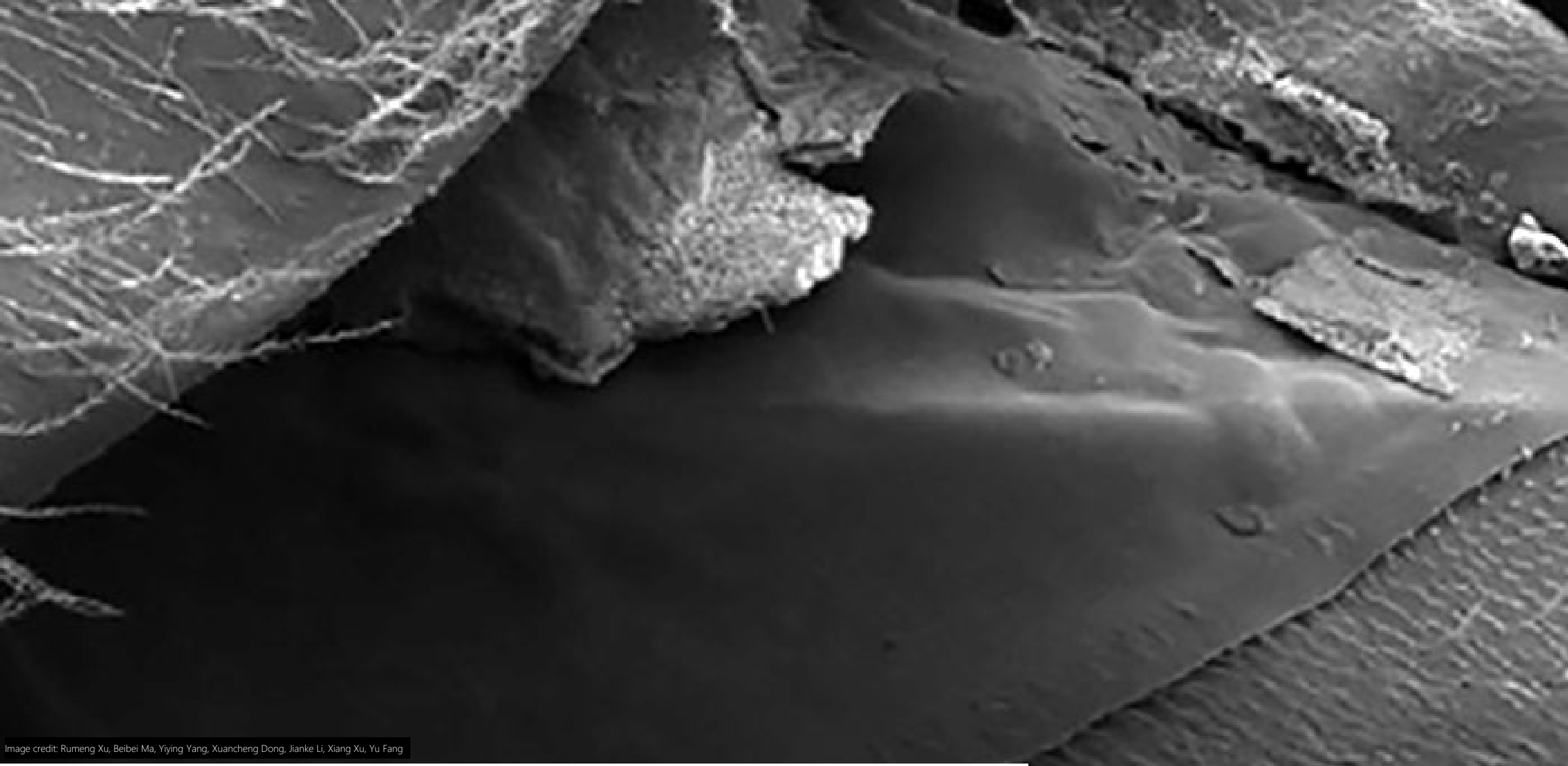


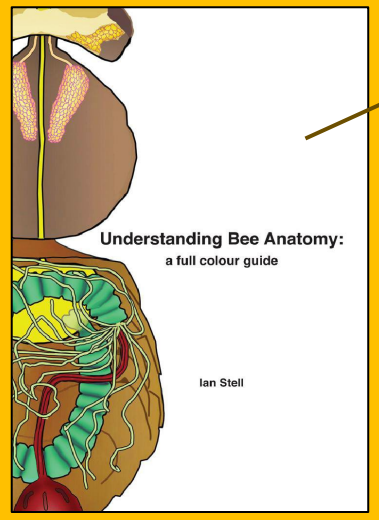
Image credit: Rumeng Xu, Beibei Ma, Yiying Yang, Xuancheng Dong, Jianke Li, Xiang Xu, Yu Fang

ARTICLE · Volume 27, Issue 3, 109279, March 15, 2024 · ***Open Access***

Proteome-metabolome profiling of wax gland complex reveals functional changes in honeybee, *Apis mellifera* L.

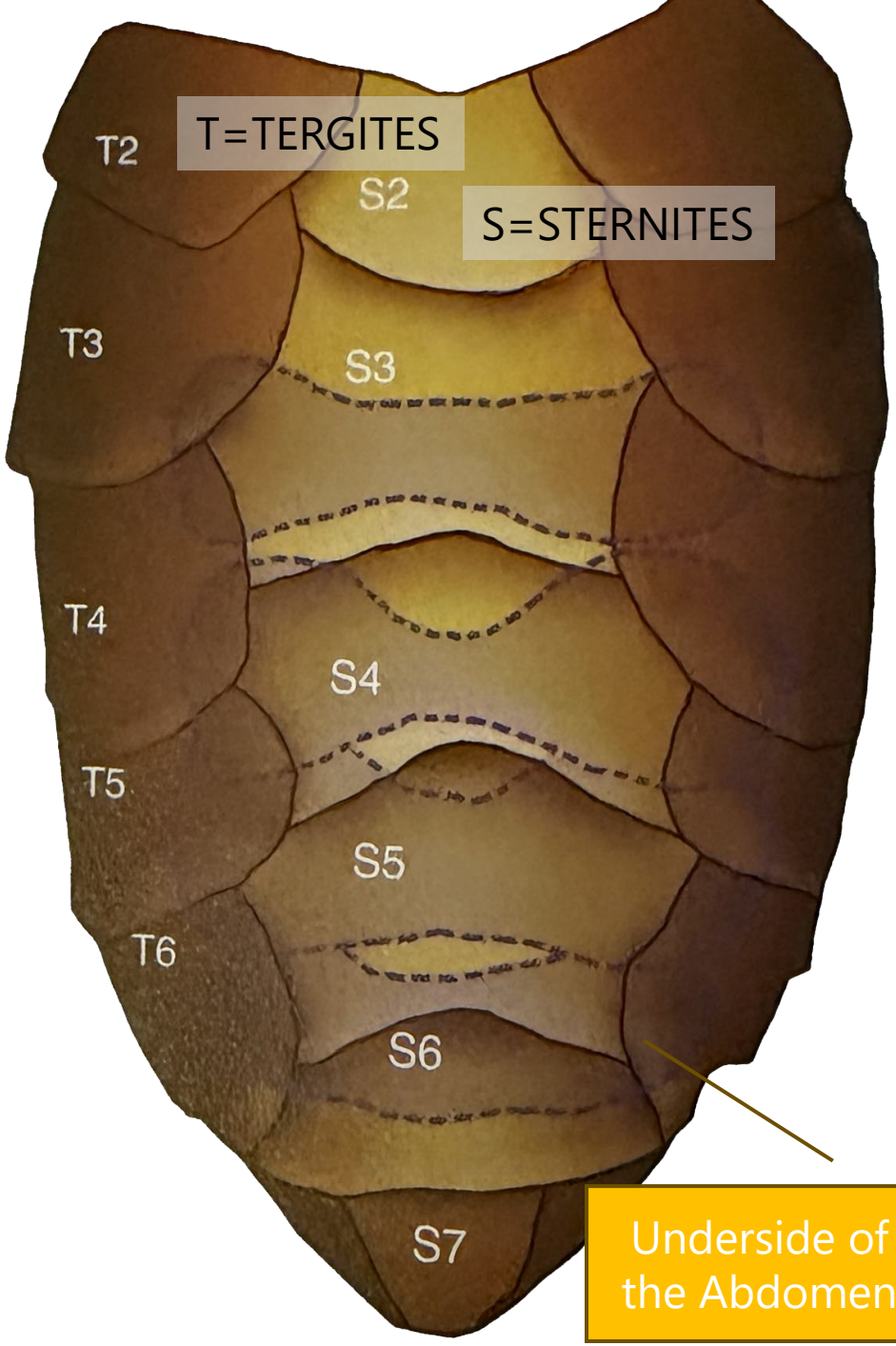
Magnification, Honeybee wax mirrors, no wax

- **There are four pairs of wax glands**
  - On Sternites S4 to S7
  - The mirrors are on the parts of the sternites overlapped by adjacent plates

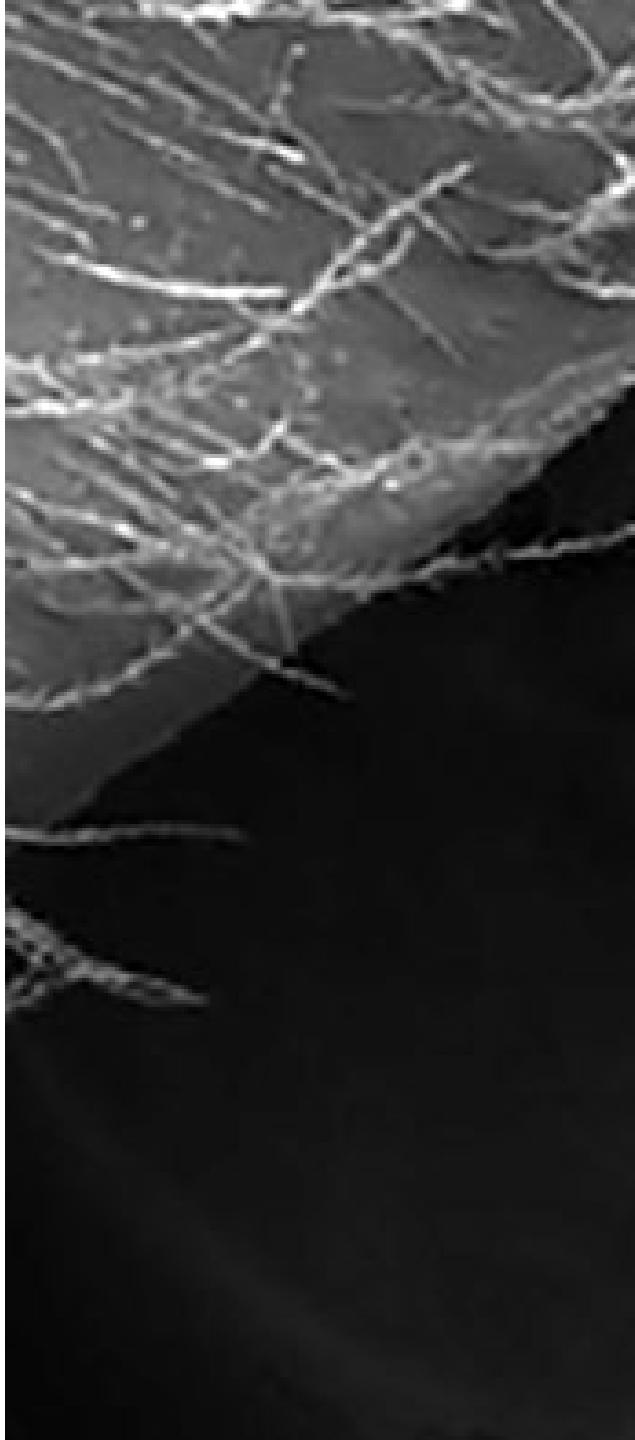


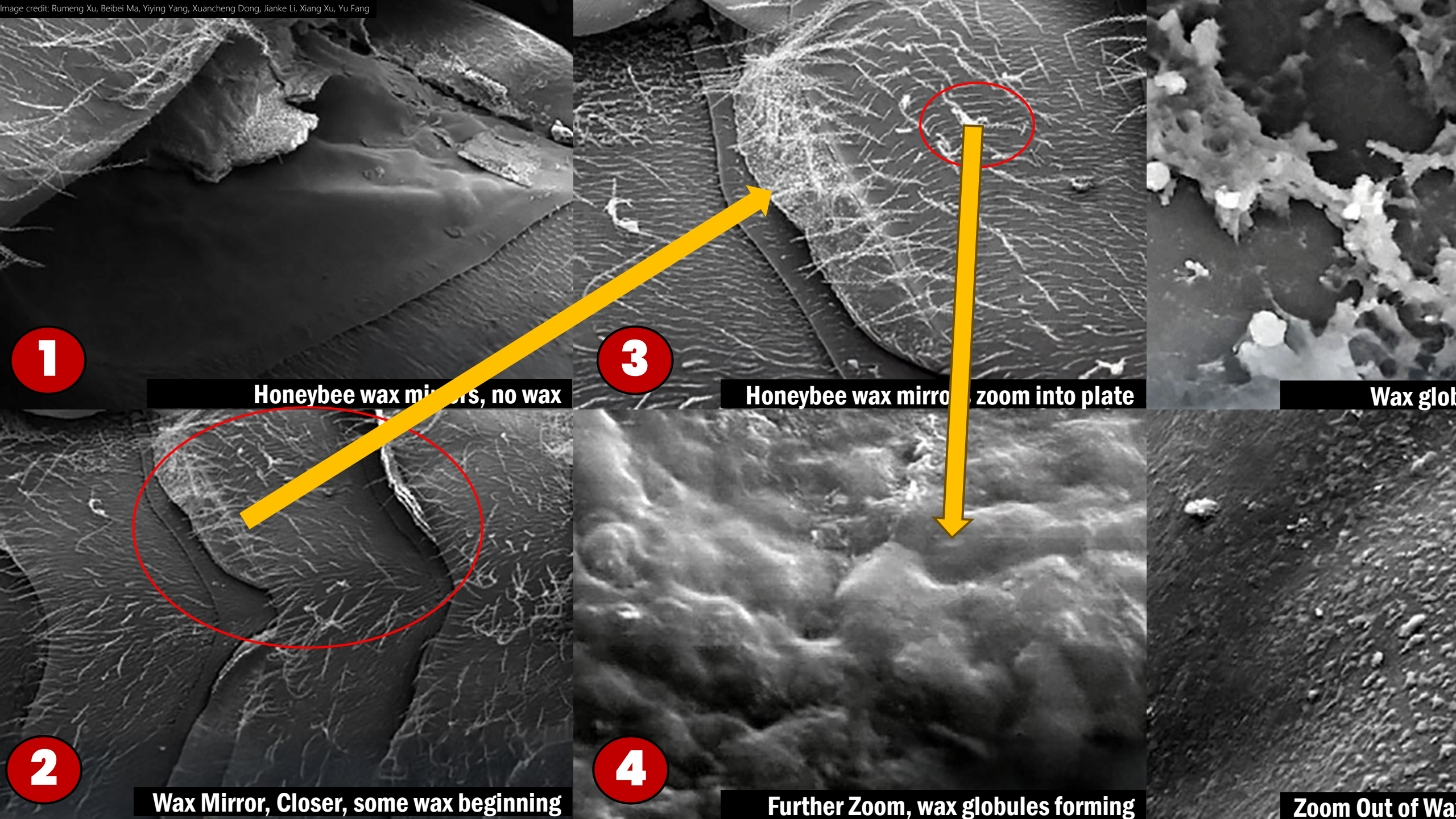
The diagram is from this great book...

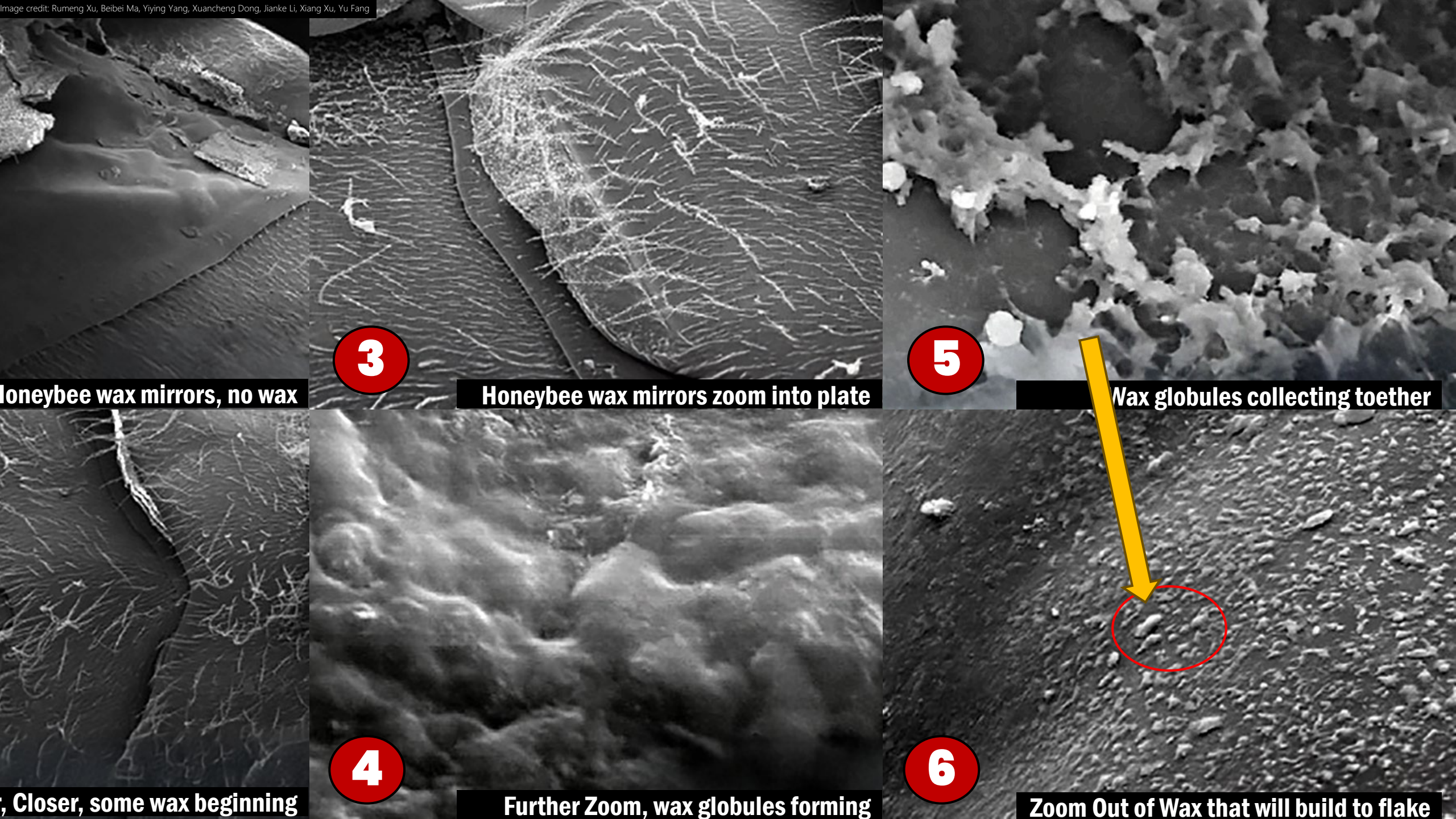
Ian Stell
Understanding Bee Anatomy



Underside of the Abdomen



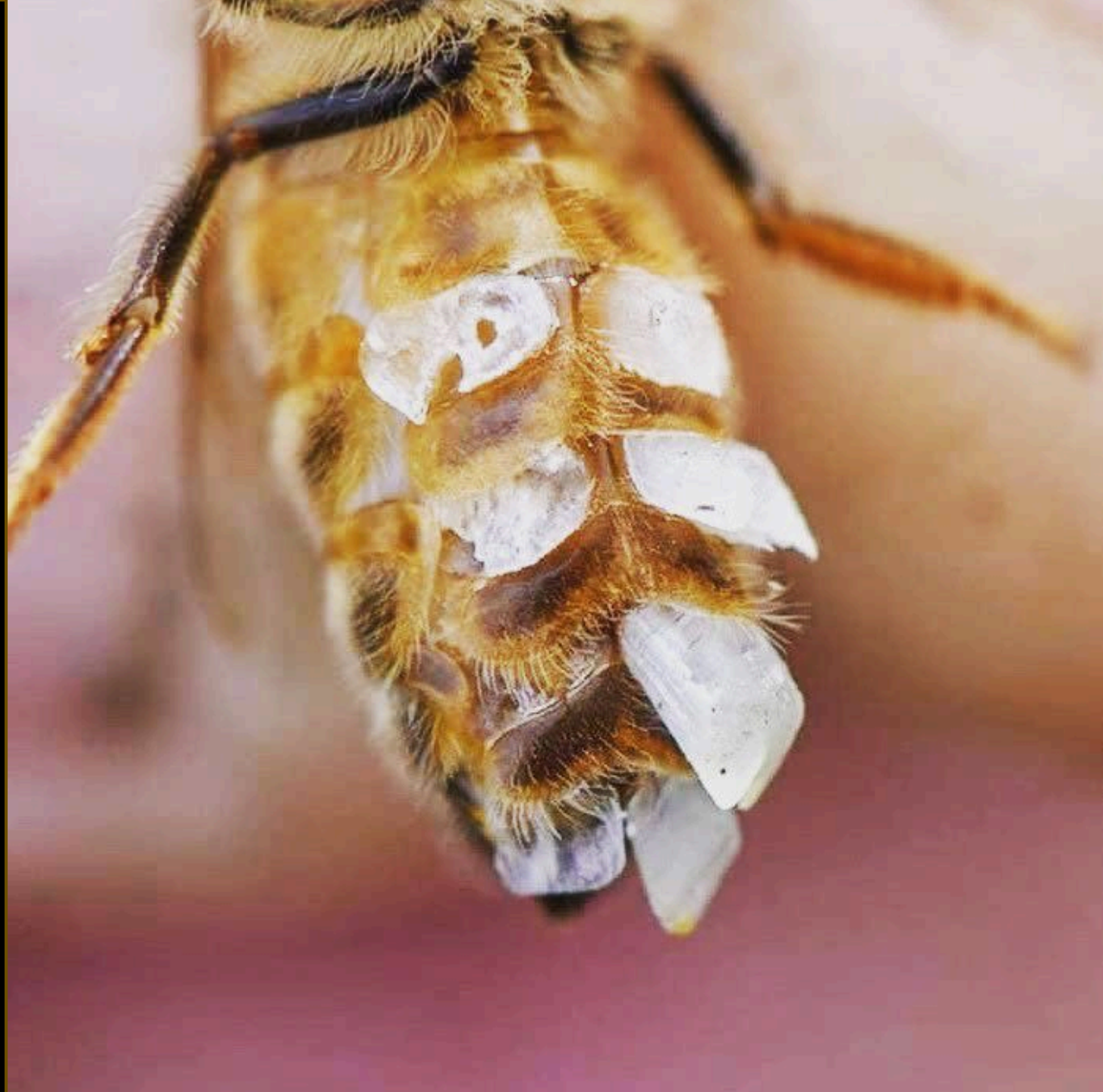

Image credit: Rumeng Xu, Beibei Ma, Yiying Yang, Xuancheng Dong, Jianke Li, Xiang Xu, Yu Fang
1
Honeybee wax mi rs, no wax
2
Wax Mirror, Closer, some wax beginning
3
Honeybee wax mirro zoom into plate
4
Further Zoom, wax globules forming
Wax glob
Zoom Out of Wa


Image credit: Rumeng Xu, Beibei Ma, Yiying Yang, Xuancheng Dong, Jianke Li, Xiang Xu, Yu Fang
loneybee wax mirrors, no wax
3
Honeybee wax mirrors zoom into plate
5
Wax globules collecting toether
, Closer, some wax beginning
4
Further Zoom, wax globules forming
6
Zoom Out of Wax that will build to flake



Eventually….
Fully formed flakes of wax on the underside of the bee

It takes about 12 hours for a bee to make 8 wax flakes



Colonies with Older Populations



Colonies with Older Populations

Once workers age past their peak wax-secreting stage, their glands atrophy and they lose the ability to produce wax.

Older bees cannot regain this ability once it’s lost

Old populations often revert to recycling tactics for wax



THE FORMULA

AS BEEKEEPERS: WHAT MIGHT WE NEED HONEYCOMB FOR?

STARTING NEW HIVES	BUILDING OUT SPLITS	MAKING NUCS	REPLACING OLD COMB

When do we typically do this work? **SPRING, EARLY IN THE SEASON**

In the early season, what will bees need so they can build wax?

THEY NEED A NUMBER OF THINGS

Components of Building Comb

PROJECT:	BUILDING COMB
DRAWN BY:	DESIGN TEAM
DATE:	05/20/2024
SCALE:	1:1
UNITS:	INCHES

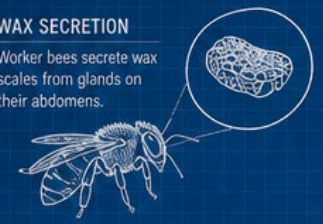
HONEYCOMB CONSTRUCTION

NATURE'S ENGINEERING

Bees work together with precision to build strong, efficient, hexagonal cells.

1 WAX SECRETION

Worker bees secrete wax scales from glands on their abdomens.



2 FESTOONING CHAINS

Bees link together in chains, creating a living scaffold from which wax is built.



3 CELL BUILDING

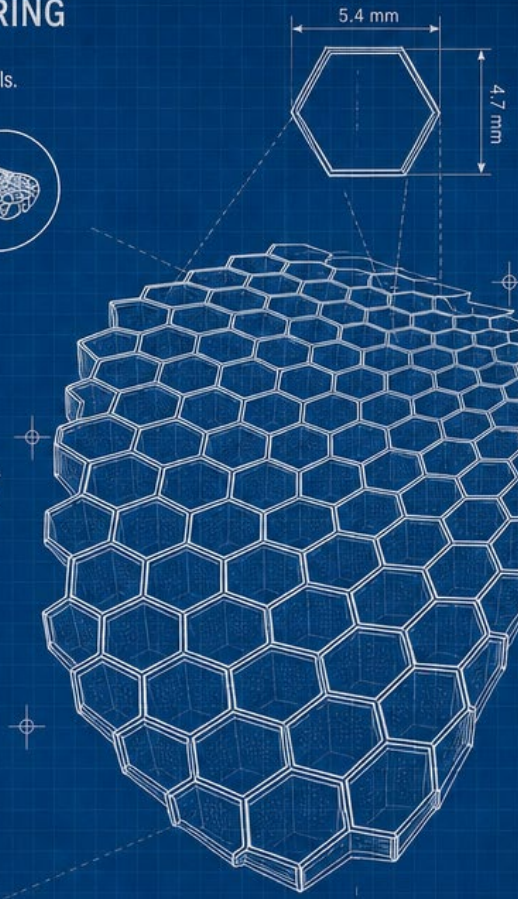
Bees shape and mold wax into hexagonal cells using their legs and mandibles.



4 COMPLETED HONEYCOMB

A strong, lightweight structure with maximum storage and minimum material.





TEMPERATURE CONTROL

Bees maintain hive temperature at ~34–36°C (93–97°F) for optimal wax malleability.

HEXAGONAL ADVANTAGE

- Maximum storage
- Minimum wax use
- Strong & efficient
- No gaps between cells

COORDINATED EFFORT

Thousands of bees work in harmony, each performing specialized roles.

MATERIAL

Beeswax
Lightweight
Durable
Slightly elastic

FUN FACT

A strong colony can build 1 frame of honeycomb in just a few days.

PROJECT:	HONEYCOMB CONSTRUCTION
DRAWN BY:	DESIGN TEAM
DATE:	05/20/2024
SCALE:	1:1
UNITS:	MILLIMETERS

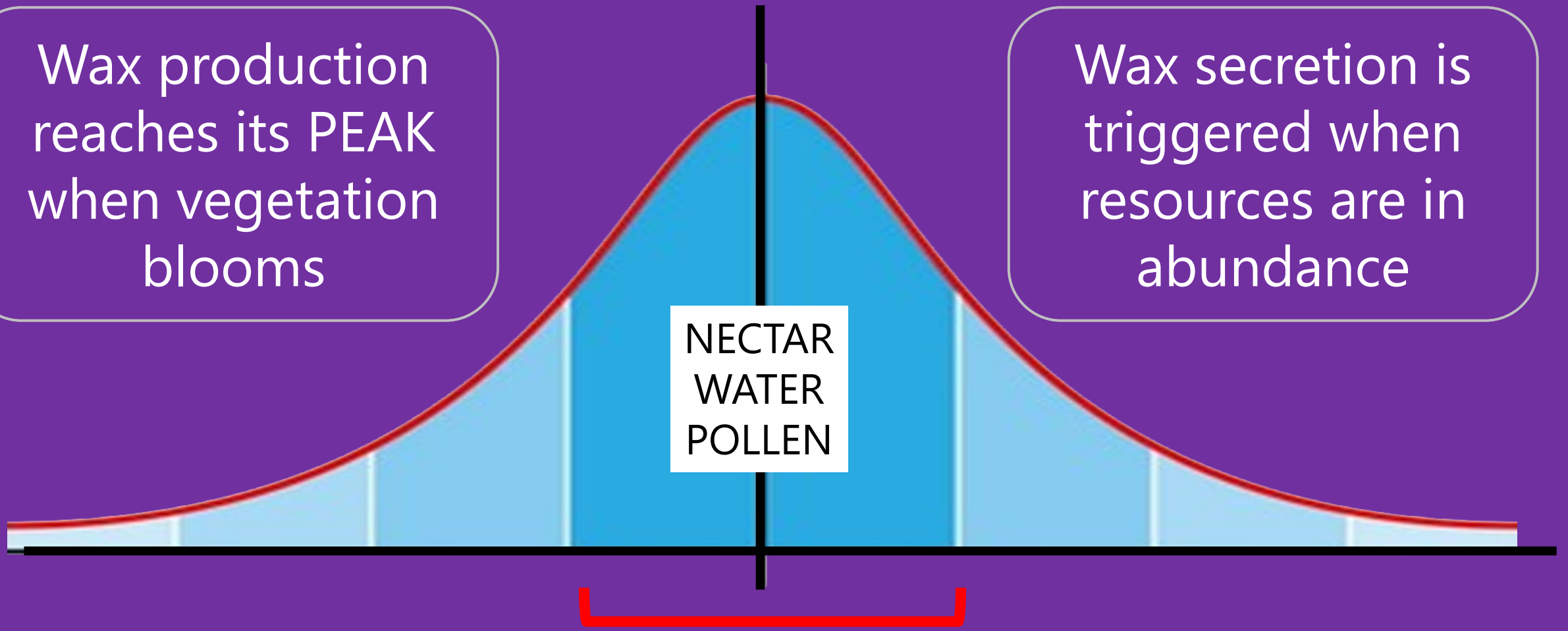
NOTES:

- Built from the top down.
- Cells are typically 5–6 mm in diameter.
- Worker bees prefer uniform cell size for efficiency.
- Structure supports honey storage, brood rearing, and hive stability.



Wax production reaches its PEAK when vegetation blooms

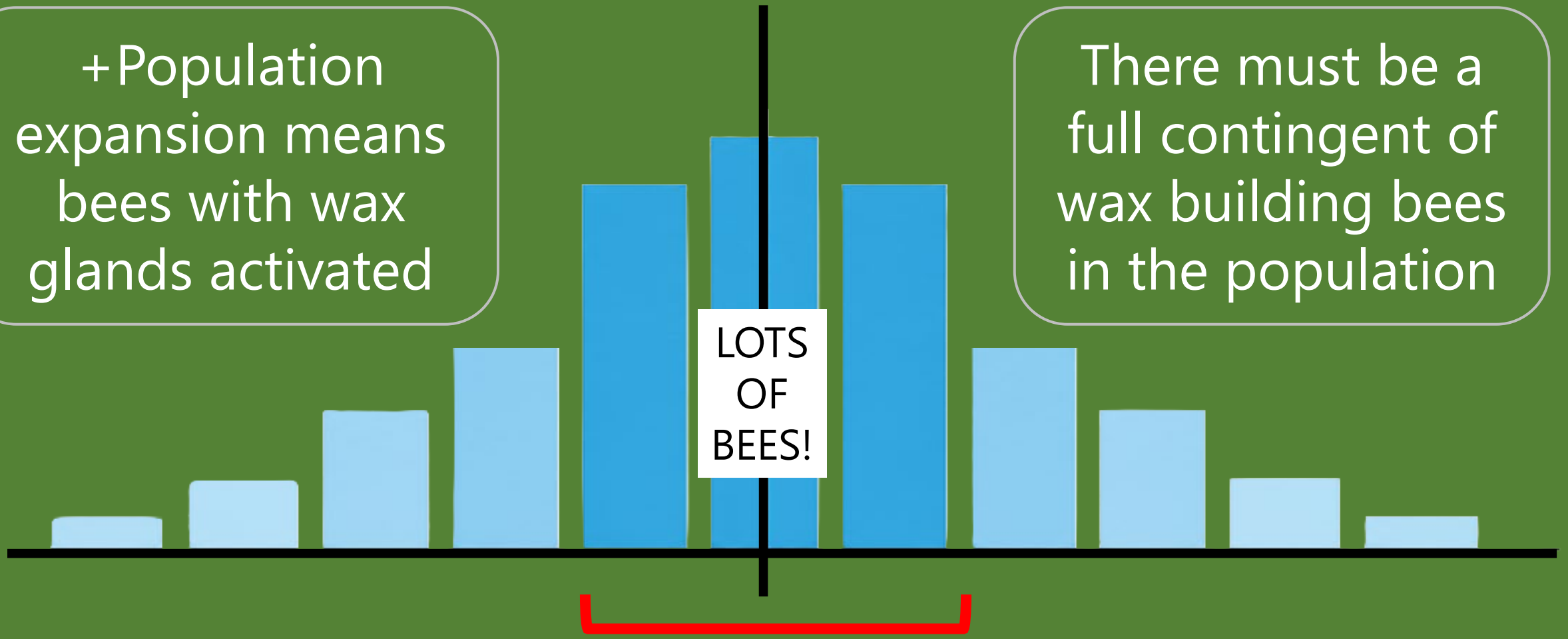
Wax secretion is triggered when resources are in abundance



+RESOURCES

+Population expansion means bees with wax glands activated

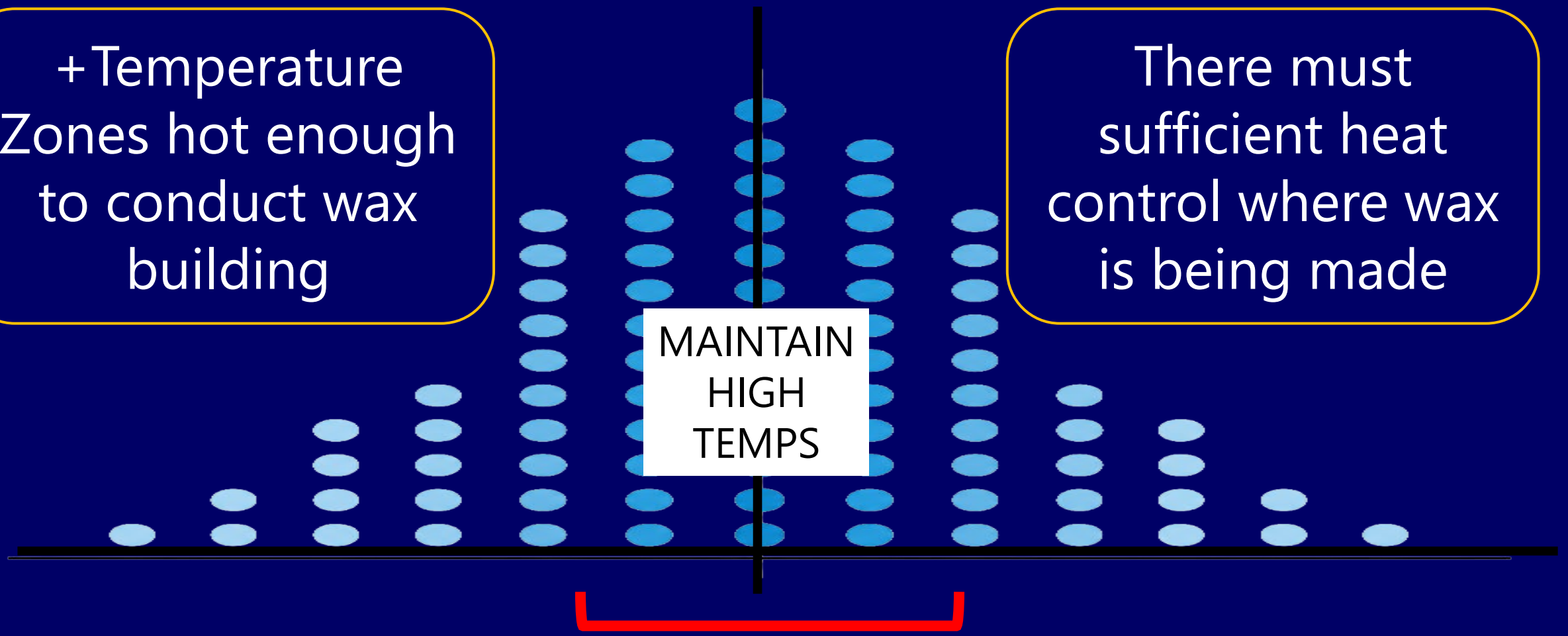
There must be a full contingent of wax building bees in the population



+POPULATION

+Temperature Zones hot enough to conduct wax building

There must sufficient heat control where wax is being made



+TEMPERATURE

+FOUNDATION

If there is foundation present for the bees to build upon

Especially if it is adjacent to brood rearing and the colony is growing

+CONGESTION

When the colony is congested and the bees need more places to store resources, they will be more compelled to build honeycomb to alleviate congestion

+GENETICS

Some bee lines are genetically wired to build comb aggressively, while others are conservative and only draw wax when absolutely necessary

+OTHER FACTORS AT PLAY

+RESOURCES

+POPULATION

+TEMPERATURE

+OTHER FACTORS AT PLAY

=IDEAL WAX CONDITIONS

HONEYBEES BUILDING WAX

+RESOURCES



6 LB Honey >
1 LB Beeswax




A single frame requires about 1/5th of a pound of beeswax



A single frame requires about 1/5th of a pound of beeswax

The wax production required for 10 deep frames is estimated to be around **2.2 lbs**



DO BEES EAT HONEY TO MAKE WAX?

Why do they say it takes 6 pounds of honey

Bees **consume nectar** during the nectar flow to make wax…

So why is always stated as 6 to 8 pounds of honey?

DO BEES EAT HONEY TO MAKE WAX?

So why is always stated as 6 to 8 pounds of honey?

It is just easier to convert sugars required for the job using honey as a source because the sugar concentration is more consistent

HOLD ON...

No One Said there was going to be math involved!

HOLD ON...

No One Said there was going to be math involved!

So then, how much nectar is needed for 10 frames?

The 2.2 pounds of wax for a 10-Frame Deep...

Nets out to **50 to 60 pounds of nectar**

*Or sugar solution equivalent of **about 3.5 gallons***

By the way, they need water and pollen (1.5 to 2 pounds) to do the work too

There is no test, and you are not going to have to remember these facts.

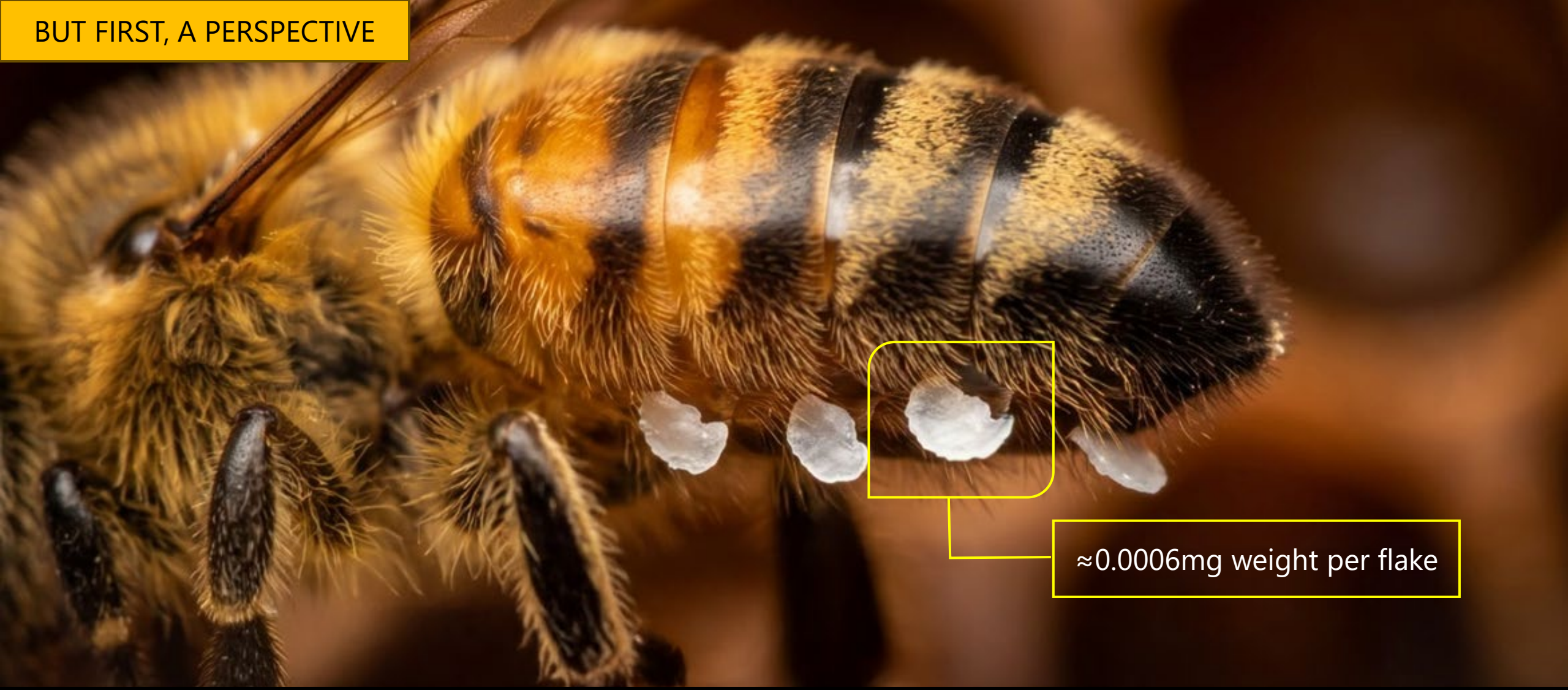
What is important is to get the takeaway

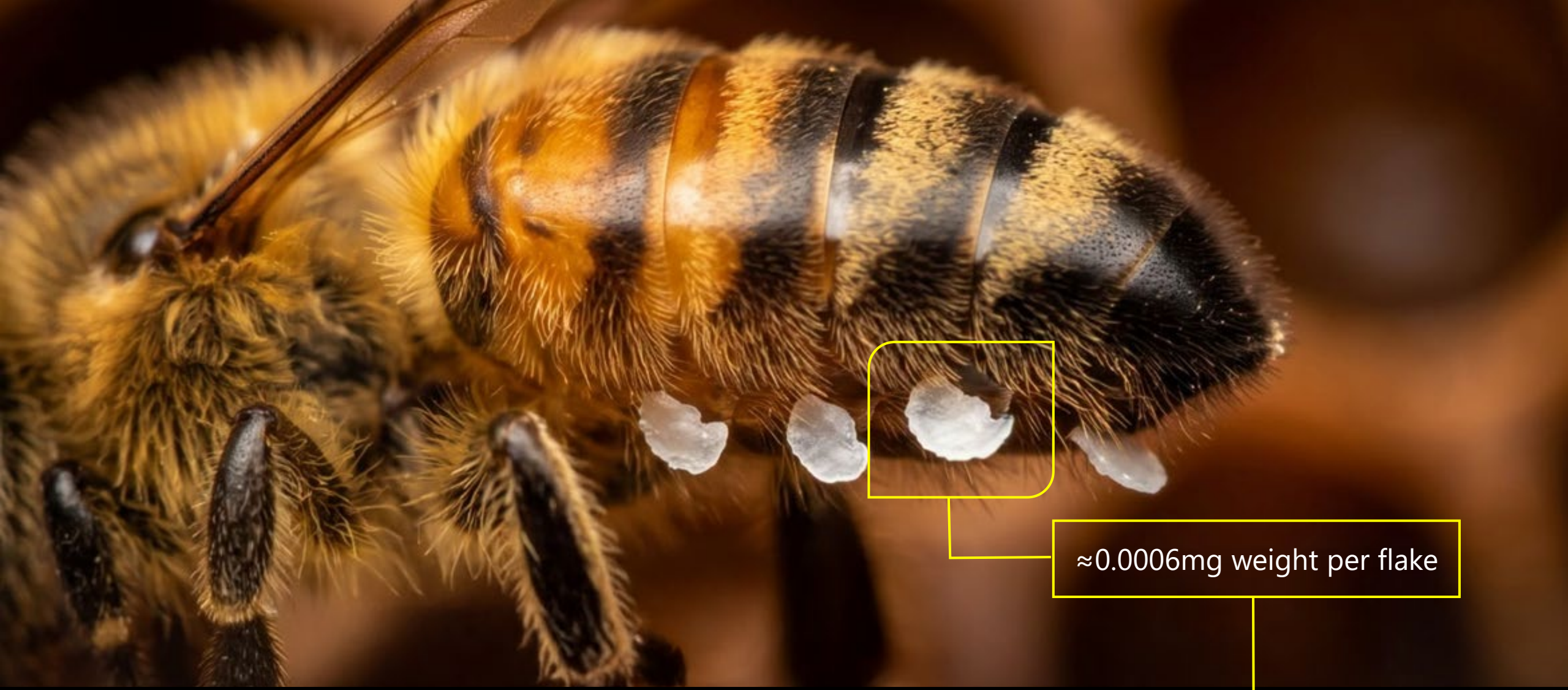
THE TAKEAWAY

It takes an **ABUNDANCE of RESOURCES especially nectar** to supply a colony that is conducting a wax building operation

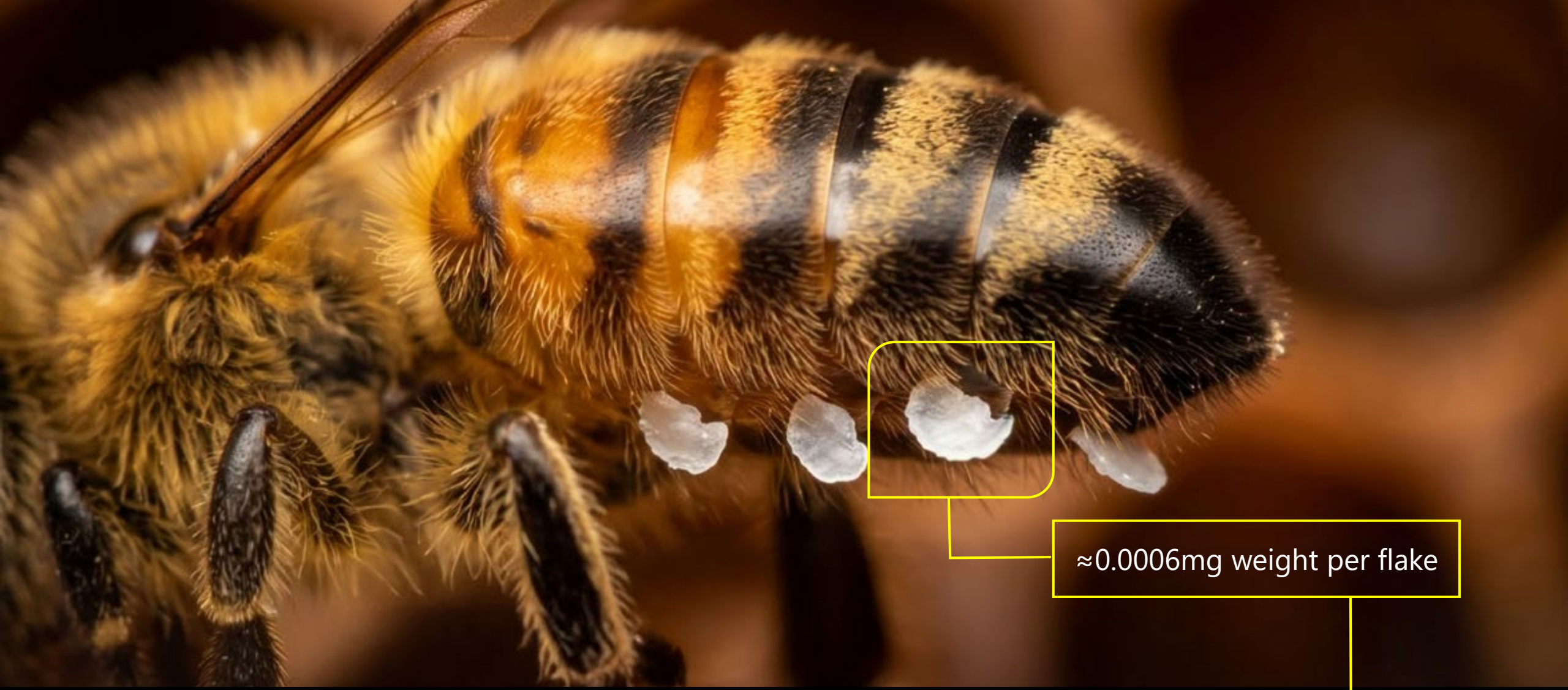
Includes pollen and water

BUT FIRST, A PERSPECTIVE





1 pound divided by .0006mg ≈ 700,000 flakes

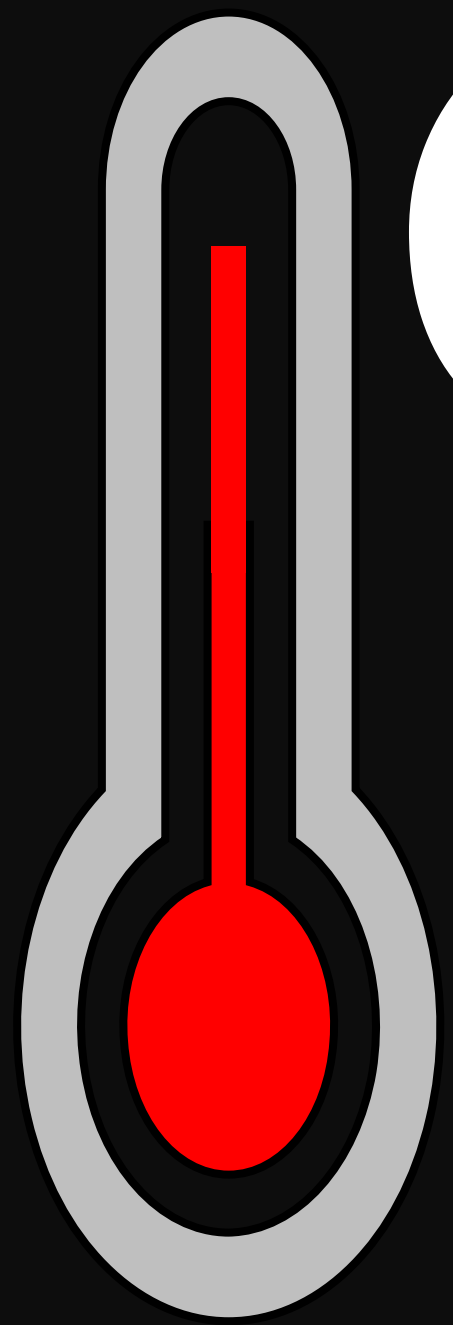


2 Deeps + 2 Mediums | ~7.3 pounds ≈ 5,110,000 flakes

THE TAKEAWAY

It takes an **LARGE NUMBER OF WAX AGE BEES** to supply a colony that is conducting a wax building operation

THE COMB ZONE



92.5° to 99.7°

~33.6
37.6 °C

Wax Zone
Temperatures

92.5° to 99.7°

Wax Zone Temperatures

Honeybees need to maintain high temperatures when building honeycomb

Significantly warmer than surrounding nest areas

92.5° to 99.7°

Wax Zone Temperatures

Wax behaves as a thermoplastic at these temperatures
This is why the comb-building area is kept so warm

Wax must be softened for it to be workable

92.5° to 99.7°

Wax Zone Temperatures

Bees do not build comb at ambient hive temperatures

They create a localized hot zone specifically for wax manipulation.

THE TAKEAWAY

There must be a **HIGH NUMBER OF BEES** working to be able to maintain **WAX ZONE TEMPERATURES**

PLASTIC FOUNDATION PROBLEMS

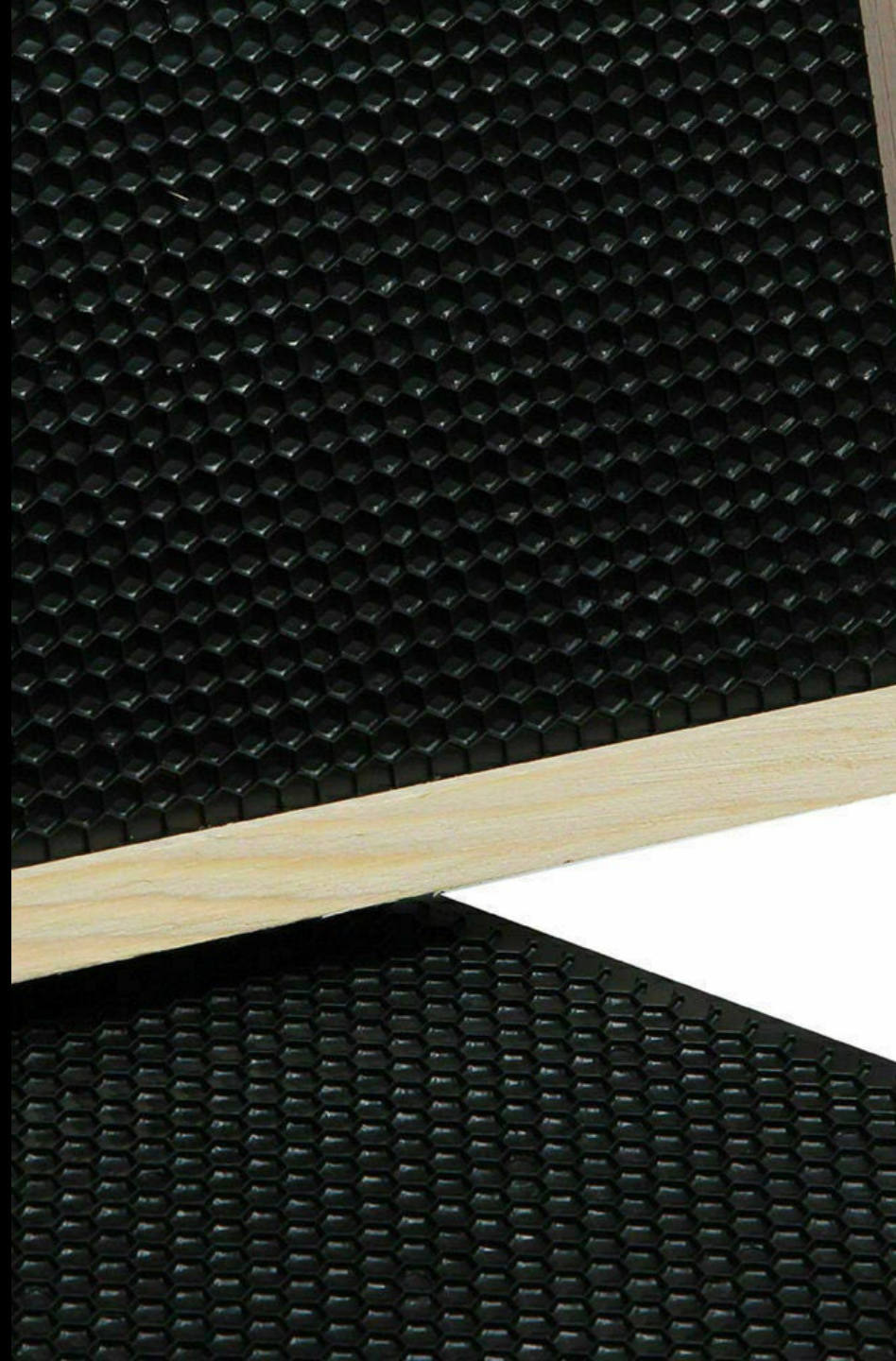
Let's talk about bees
building wax for you.

Specifically, let's cover
some possible problems
and how to get past them.

PLASTIC PROBLEMS

Inadequate Coatings from the

- Inadequate Wax on the Ribs
- Foundation requires a coating of beeswax on the top edges of all the ridges across the entire face
  - Too many times, plastic foundation sheets are sold with little to no coatings
  - They can also be inconsistent from edge to edge
  - Wax should be visible on the edges with a slight odor of wax



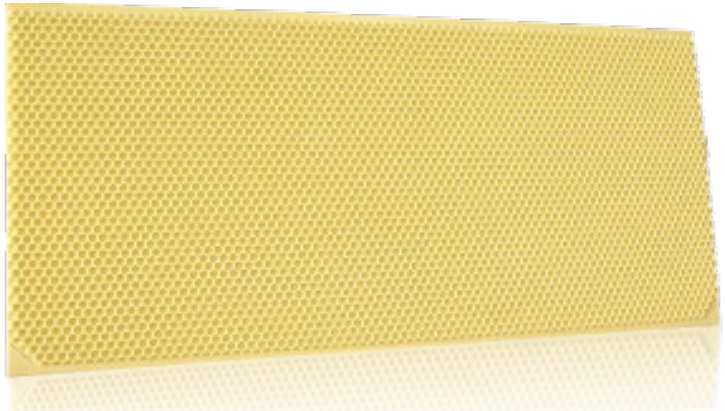
PLASTIC MANUFACTURING

- Consider the source of plastic for PLASTIC FOUNDATION
  - Not all plastics are the same
  - Reputable bee supply houses know the supply chain and ensure that high-quality plastic is used for plastic substrates
- Plastic can be problematic in many ways
  - The formulation of the plastic could be a problem (ingredients)
  - The release agents left behind in manufacturing (tainted coatings)

Plastic Could be the Problem

PLASTIC FOUNDATION





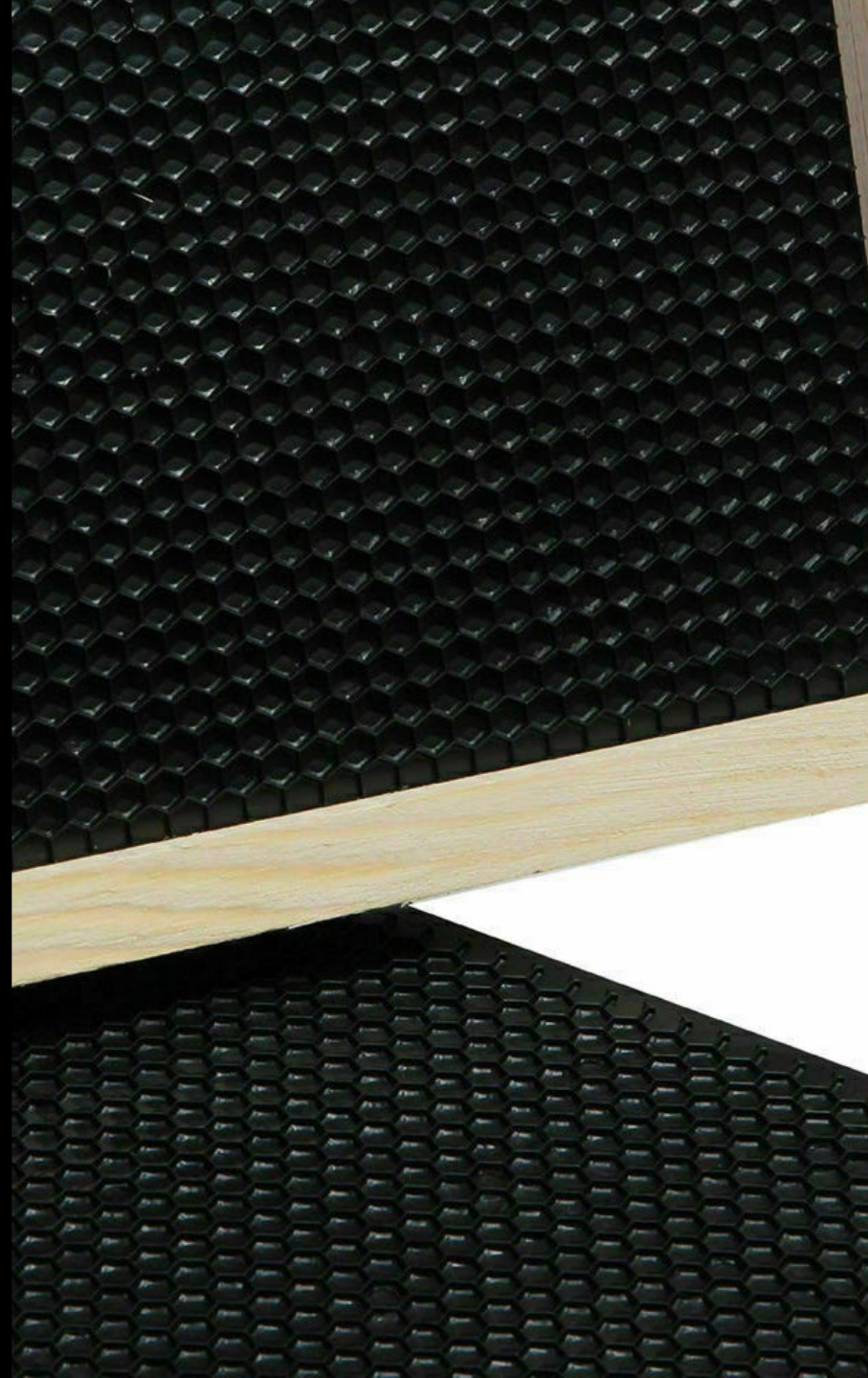
RITE-CELL®

- DEEPER CELLS
- HEAVIER CORE
- SHARPER CELL EDGES

COATING PROBLEMS

WAX COATINGS

- Not pure 100% beeswax
  - Sometimes manufacturers cheat and use non-beeswax to cut costs
  - Honeybees might be reluctant to build on plastic frames if the wax is not pure beeswax
- Tainted Wax
  - Sometimes wax becomes tainted in storage
  - The wax absorbs something, or impacted by the manufacturing process



Avoid Undesirable WAX COATINGS & Exposures

ONLY PURE BEESWAX

- Use your own fresh ‘known’ beeswax
- If buying; **buy from only reputable suppliers** that know wax coatings
  - **Low cost often equates to adulterated coatings** – coatings that have may been exposed to chemicals or mixed with lower quality waxes
  - Avoid outlets that source from overseas
- Honeybees are highly sensitive to poor quality wax coatings
- Use care when storing wax to prevent it from becoming tainted

GOOD COATINGS GONE BAD!

Good Coatings – But the Bees Strip it Off

Good coating are used, *then things go sideways*

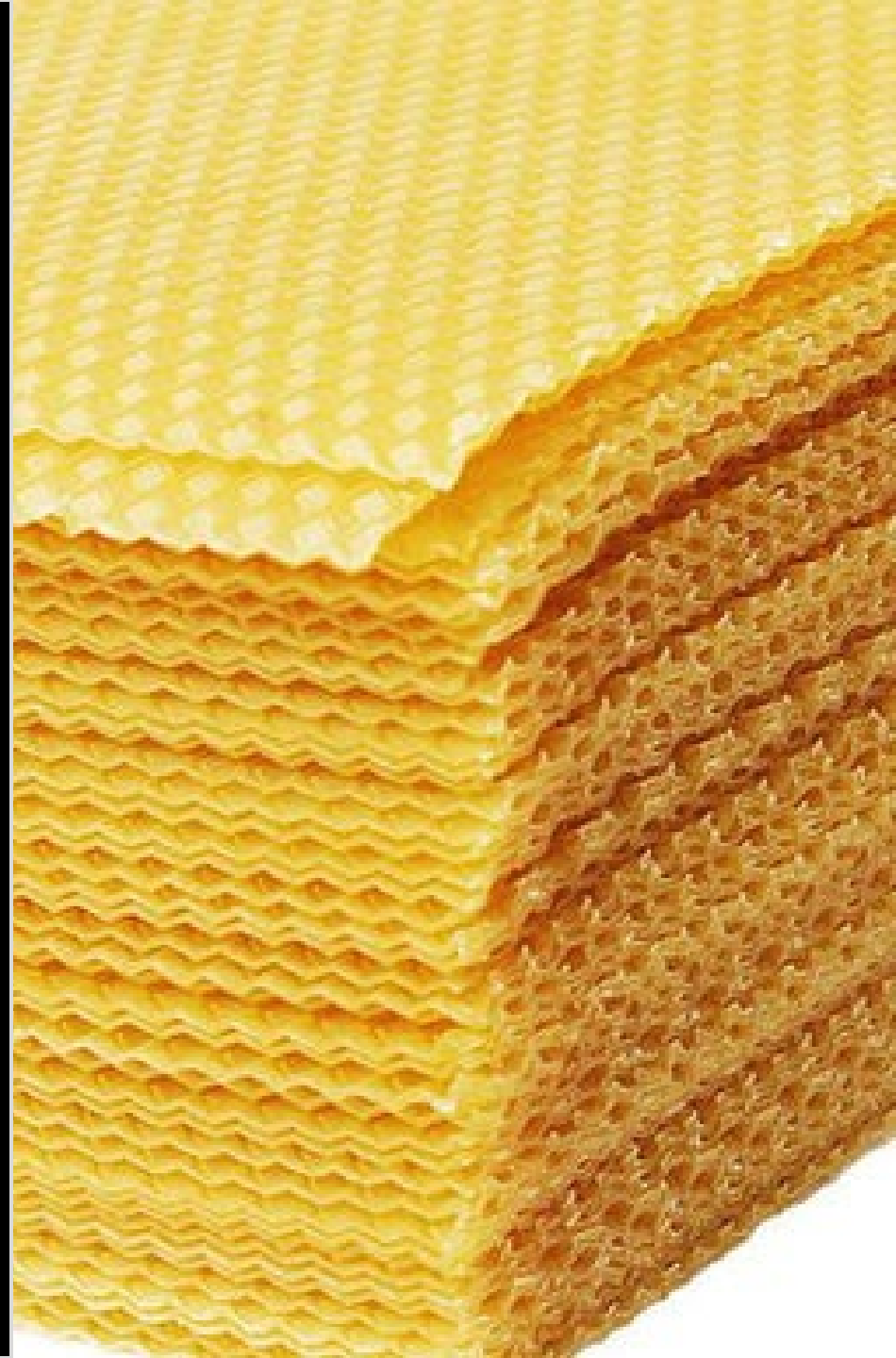
- Frames with adequate coatings are placed in the nest for bees to build out
  - Bees in need of wax, come and strip the coating off surfaces
  - They repurpose the wax for use elsewhere; This leaves a frame with no coating
  - Often bees come in and build wonky comb on the stripped surface

RE-COAT stripped frames: *Shake the bees off*, recoat, and replace

Wax, Problems

Wax Foundation: Fragile/Finnicky

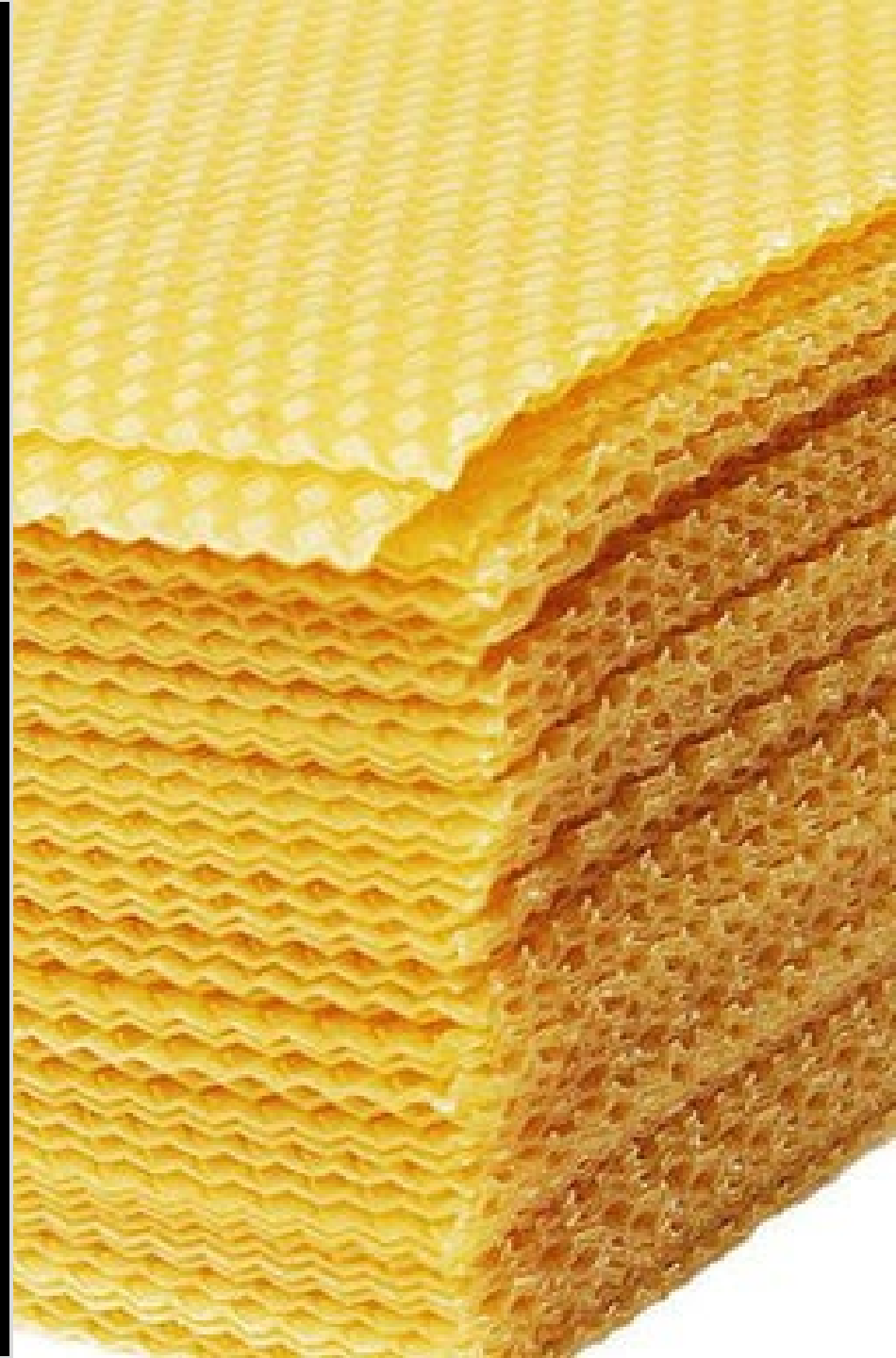
- Wax when it is cold is very fragile
- The age-old problem with wax is blowouts: Crimp wire helps
- Sometimes it does not hang well in the frame; even when it is pinned



Wax, Problems & Pluses

Wax Foundation: Better for Bees

- Bees build comb faster on wax foundation
- Wax is more conducive to vibration communications
  - Bees communicate by vibrating on the comb – in contrast plastic negates vibration
- Beekeeper benefits here and there
  - Example, cutting out queen cells

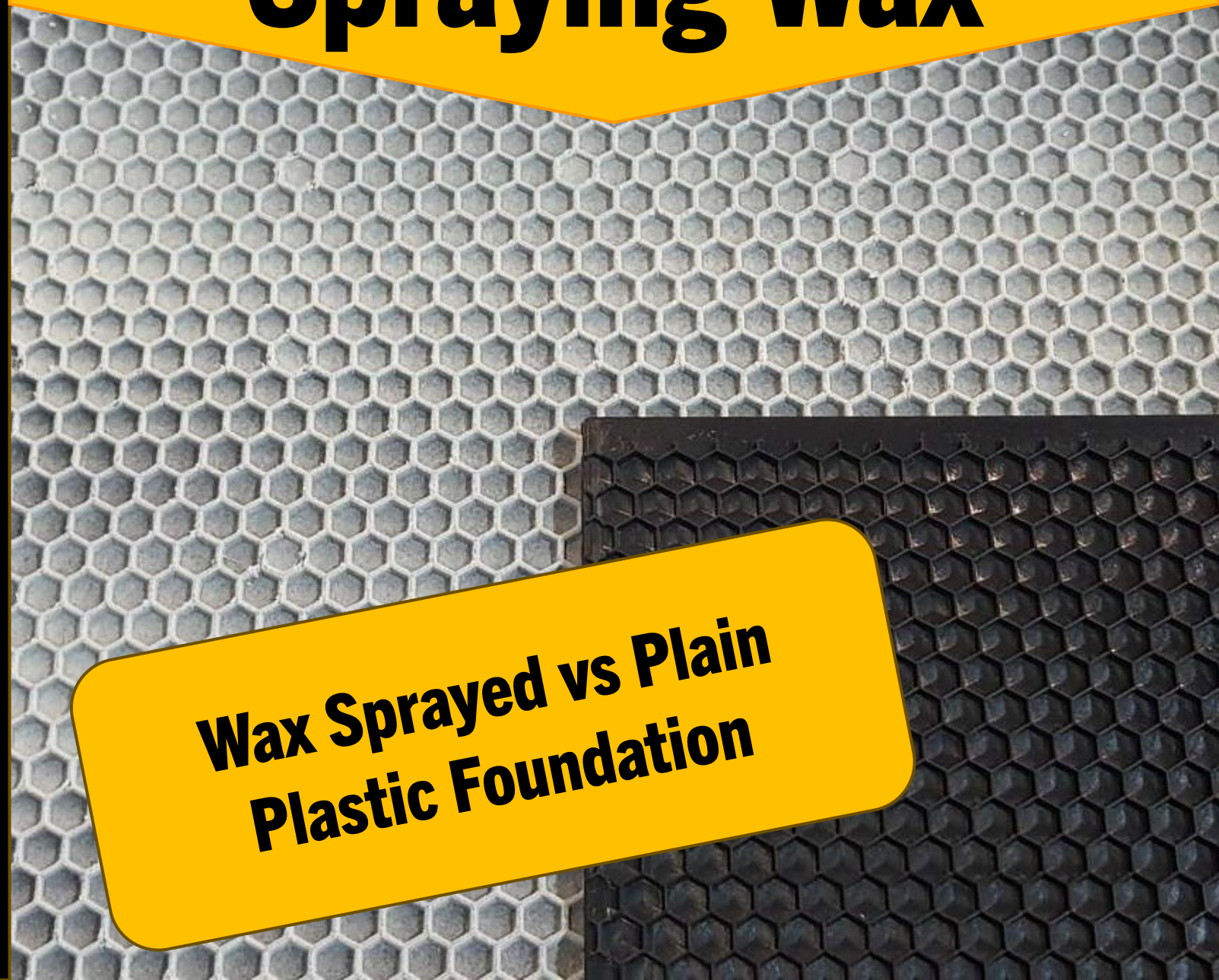


FIXING FOUNDATION

This foundation was sprayed with a wax coating.

Is this a good idea?

Spraying Wax



Spraying

Yes, It is OK

Fussy, but it can be done

- Use clean, filtered beeswax (cappings wax is ideal)
- Heat wax to 160–170°F so it atomizes but doesn't scorch
- Apply light, even coats — multiple passes are better than one heavy one
- Keep the sprayer warm so wax doesn't clog
- Coat both sides; **avoid filling the cell bottoms**
- A thin, even mist is better than a thick, drippy layer.

PROBABLY THE MOST POPULAR METHOD

- Use clean, filtered beeswax (cappings wax is ideal)
- Take a block of clean wax and **heat it** with a heat gun, or some other means
- **Rub it across the ribs** and deposit the wax evenly across the rib surfaces

Wax Crayon Rubbing…

PROBABLY THE MOST POPULAR METHOD

- Avoid depositing wax in the base of the cell indentations as much as possible
- Try to find a balance of a decent coating without getting heavy globs
- **Coat every cell rib**, across the frame from top to bottom, from side to side

Wax Crayon Rubbing…

Heated Wax Application

- A cold ‘crayon’ of wax was used to rub wax one half
- A warm ‘crayon’ heated with a skillet was used for the second half
- Slightly warmed waxed, rubbed on the ribs, seems to makes quite a difference in the bees drawing it out to comb



Wax Crayon Rubbing…

What about Rolling?

HOW TO ROLL WAX ONTO PLASTIC FOUNDATION

- **Use clean, filtered beeswax** — impurities cause streaks and poor adhesion.
- **Heat wax to 150–165°F** so it stays fluid without scorching.
- Use a warm foam roller for an even coat that doesn't shed fibers.
- **Apply thin, even layers** — several light passes are better than one heavy one.
- Keep the wax tray warm so the roller loads consistently.
- Coat both sides, with a slightly heavier coat for better acceptance.



Paint Brush?



Paint Brush?

PAINT BRUSH

- Dip into melted wax
- Horizontal painting
  - Helps apply to ribs – without filling the bottoms
- Dedicated Brush
  - Not good for anything else after this

Redo Wax Foundation, *Sure*

- Scrape off any remnants of honeycomb with a hive tool
- Power wash off any residual wax and reapply wax
  - Sometimes you can use a high-pressure air nozzle and blow the bits off the plastic
- Some soak comb in a caustic soda solution for a day or more and then it washes off with a high pressure spray

What about reuse?

Is it Economical?

- For the cost of new foundation sheets, it might be more efficient to just buy new – what is your time worth?

– It is personal preferences whether you want to go this route

What about reuse?

GOOD WAX STOLEN!



GOOD WAX STOLEN!



Dealing with Holes

Often you can just leave it

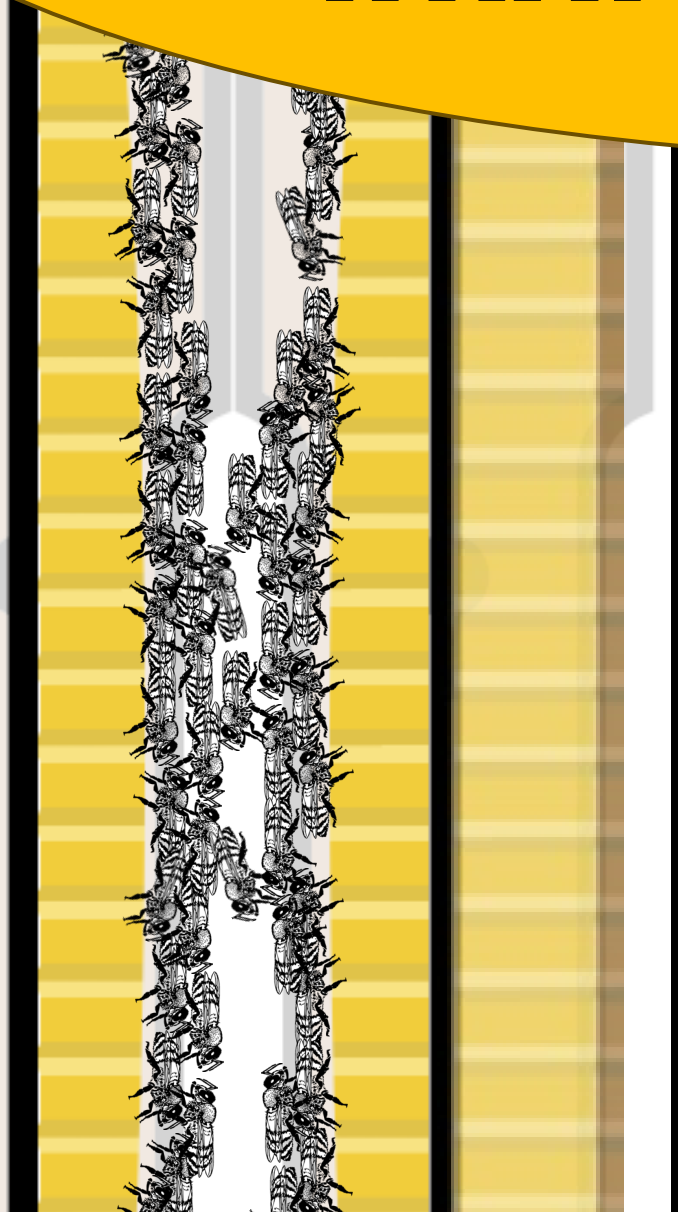
- Bees will build comb and fix the holes in wax
- Sometimes the holes are extensive
  - If you find they really did a number on the wax, consider replacing it
  - With big holes they will often draw drone brood comb early in the season
  - You could also cut up other wax sheets to repair it


WONKY
COMB

Sometimes bees build wonky comb.

Knowing why helps you to avoid it.

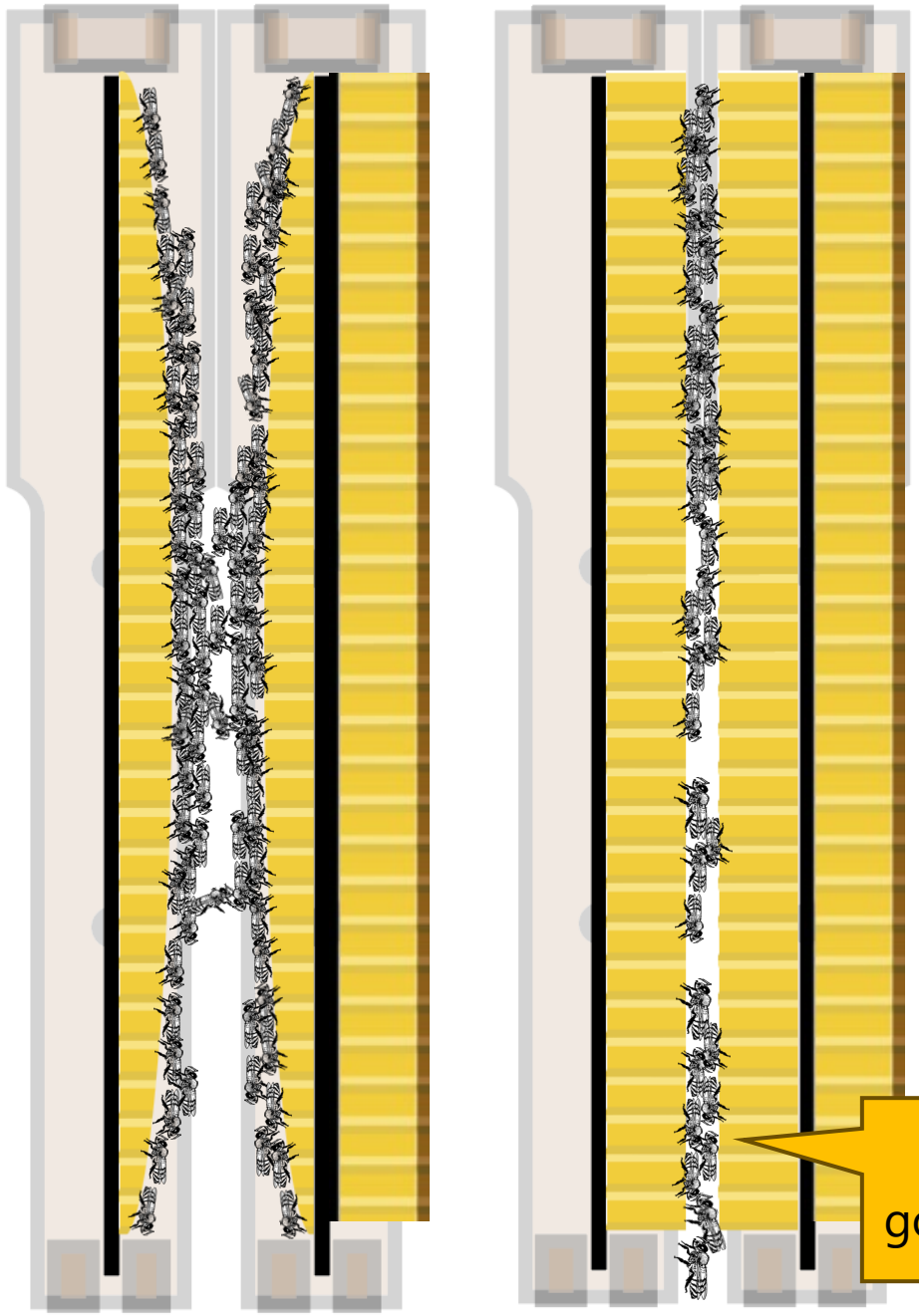
WHAT GOOD LOOKS LIKE



High Populations; Building Boom

Workers build adjoining frames

- They build opposite sides at the same time
- They meet in the middle
- The space constraints force bee space



This is what good looks like

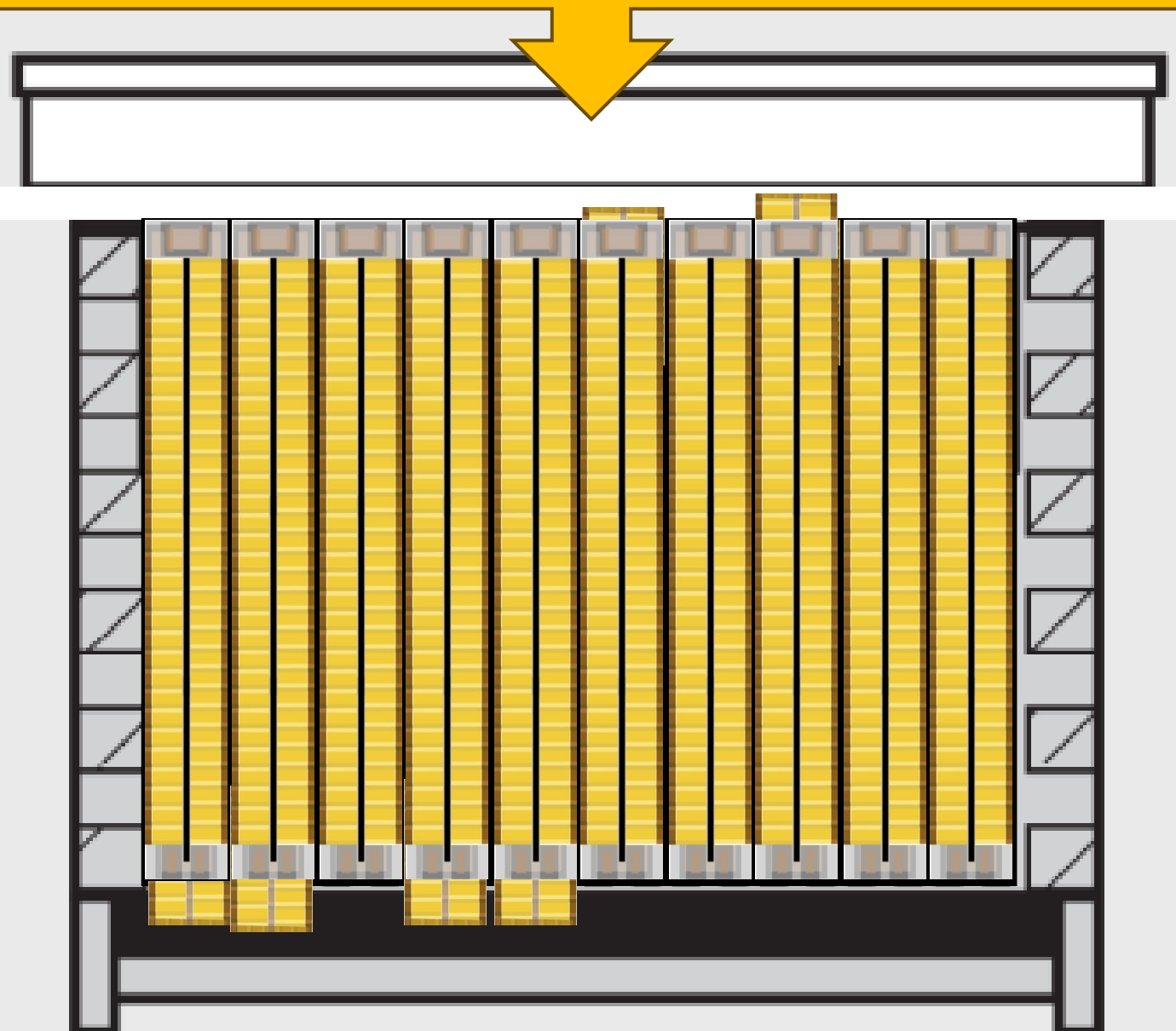
High Populations; Building Boom

- Bees contacting bees on either side signal them to stop
- The spacing of the frames controls the depth of the cells

WHAT GOOD LOOKS LIKE

What's Going on Here?

Too much of good thing



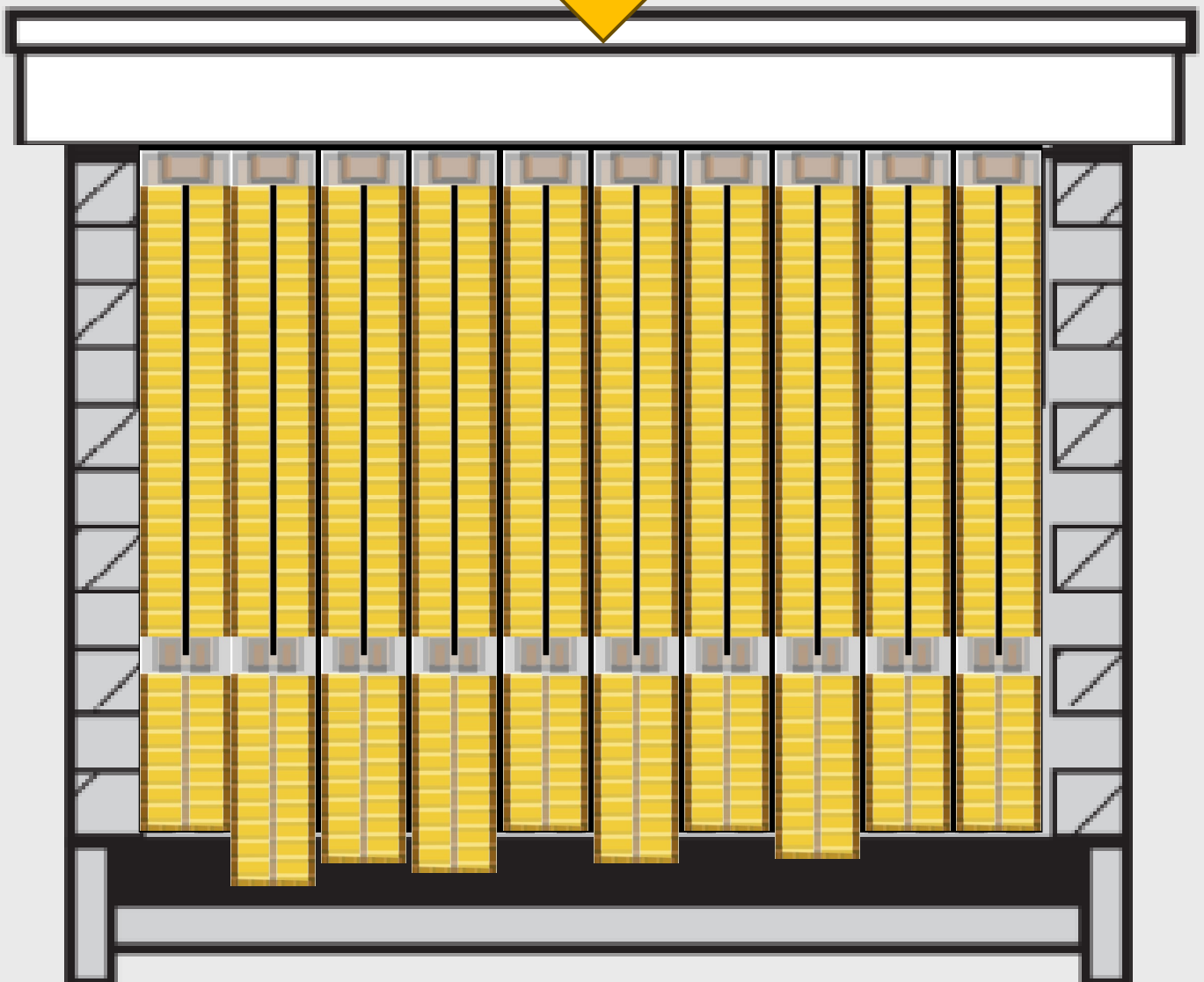
Comb below deep

- They could want to build so much that they build over bottom board

Comb above frames

- They might build in the margins and above the top bars
- They may build on the inner cover or under the roof

What's Going on Here?



Mediums in a Deep

- Sometimes it is an errant frame…
- Sometimes it is a mistake made by a new beekeeper
- Other times it is done on purpose (drone culling)

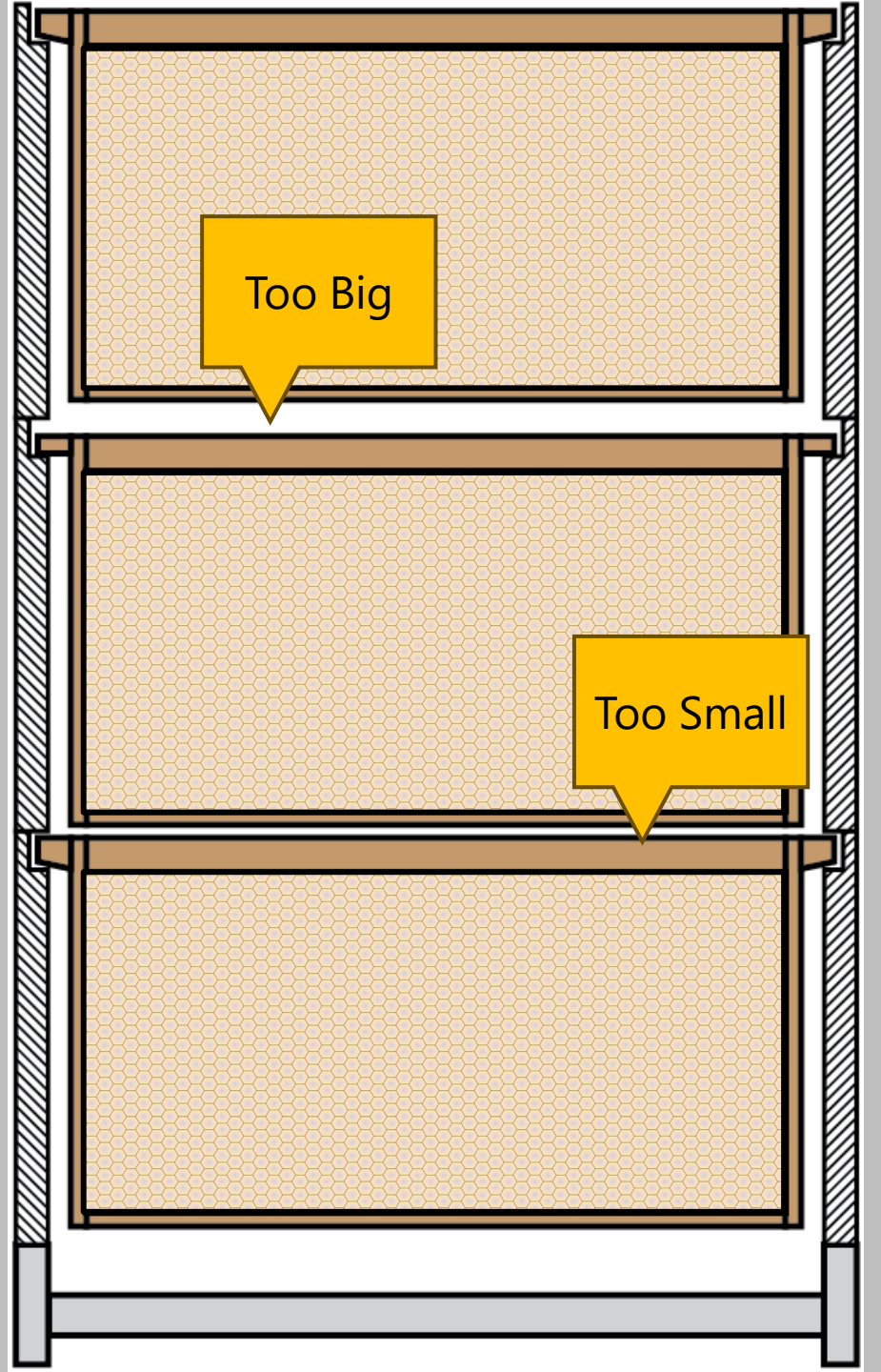
- Fixing this – if it is broken – is a matter of cutting off the errant comb and putting in the right frames
- *Reuse maybe?*

EQUIPMENT SPACING

Frames Hanging In Woodenware

How frames hang in the boxes matters

- Gaps between walls – excess comb
- Gaps from frame tops to frames above
  - Bees build excess comb or they propolize frames
- Gaps under frames, over bottom board
- Medium Frames in deep boxes
- Mismatched frames (different suppliers)
  - Frames from different suppliers are different dimensions. Sometimes it leads to inadvertent gaps that violate bee space
  - We coined this problem as **The Frame Game**



The Frame Game



Too Much Space below the frames



Image credit: Levi Edvalson

Outer Space VIOLATIONS

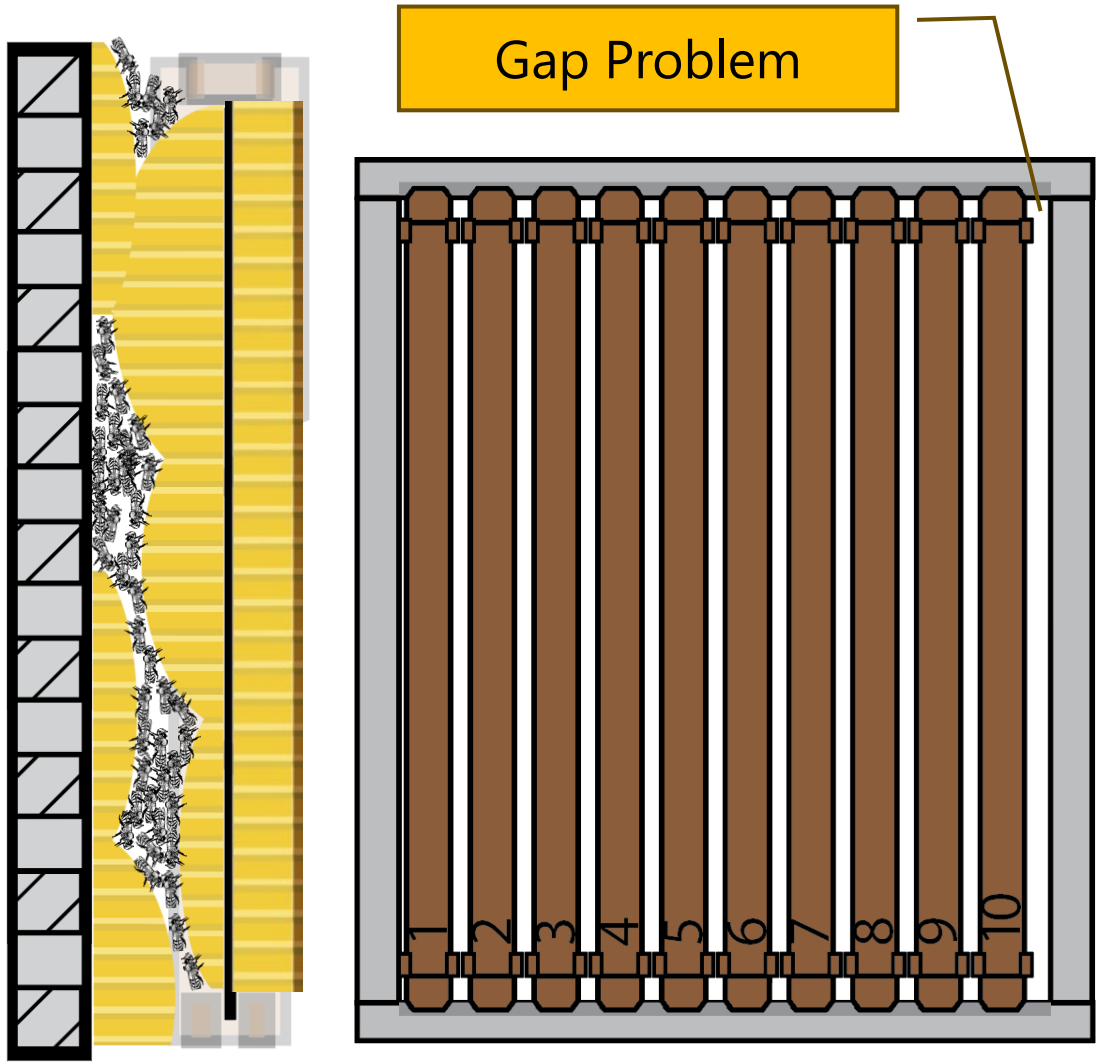
Frame 1 and 10 problems

- Bees will build into the open available space
- This is a frame that was too far away from the woodenware
- It could be caused by unconventional boxes that are too wide
- It can be caused by frames that are a mismatch to the wood box



Excess Space on the Outside

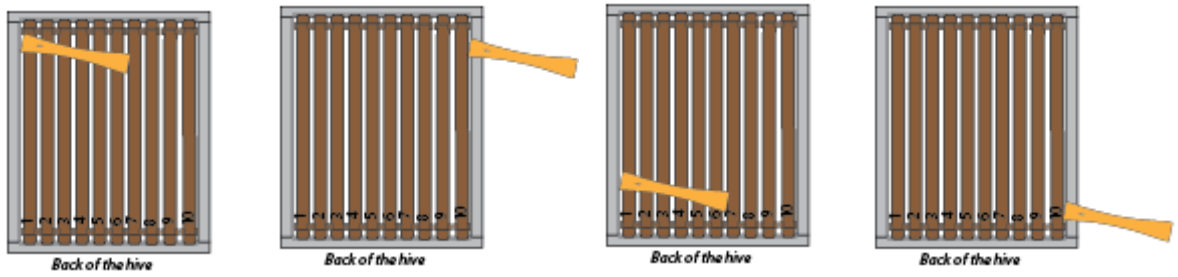
Too much space between frame 10 and the wall

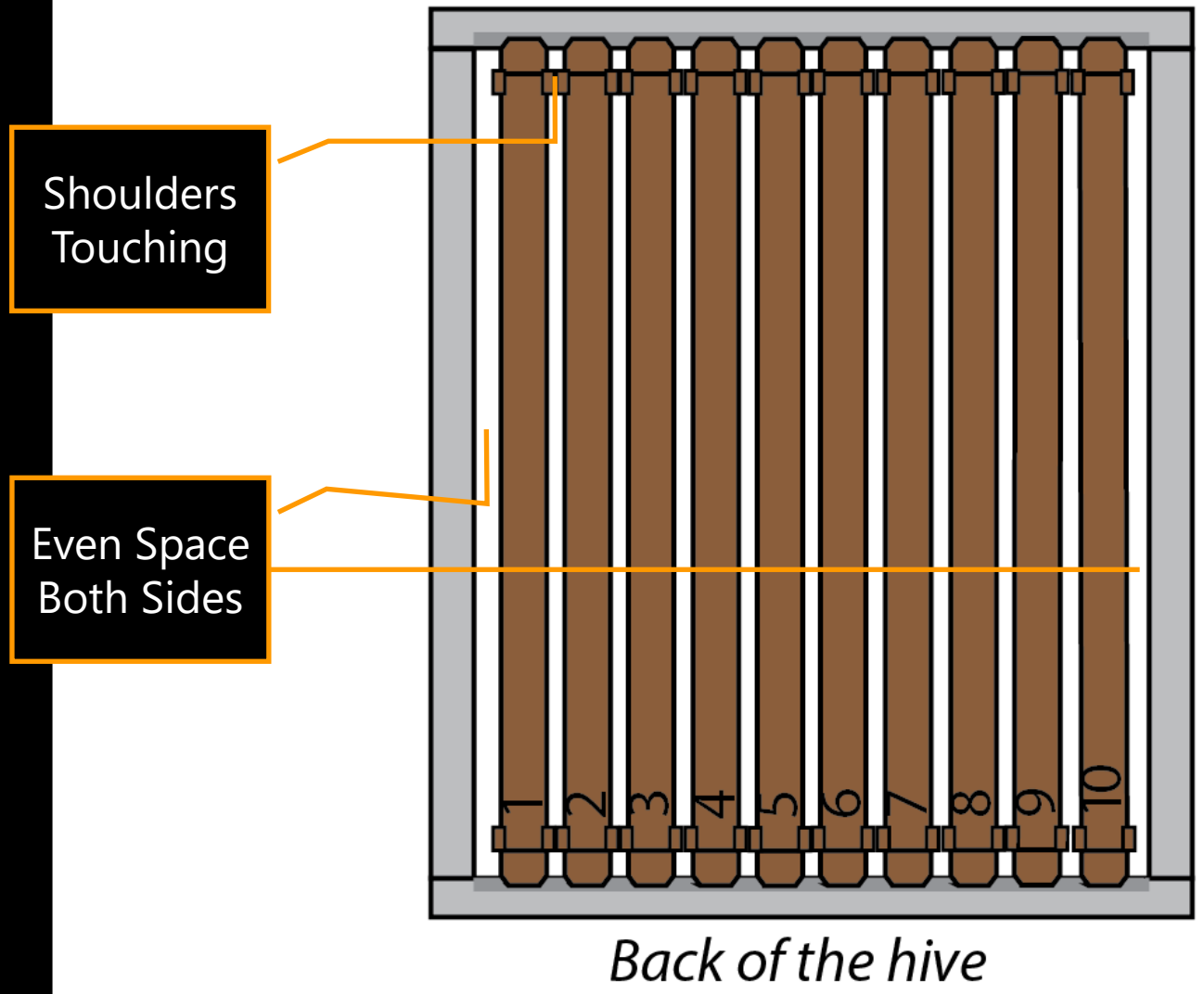


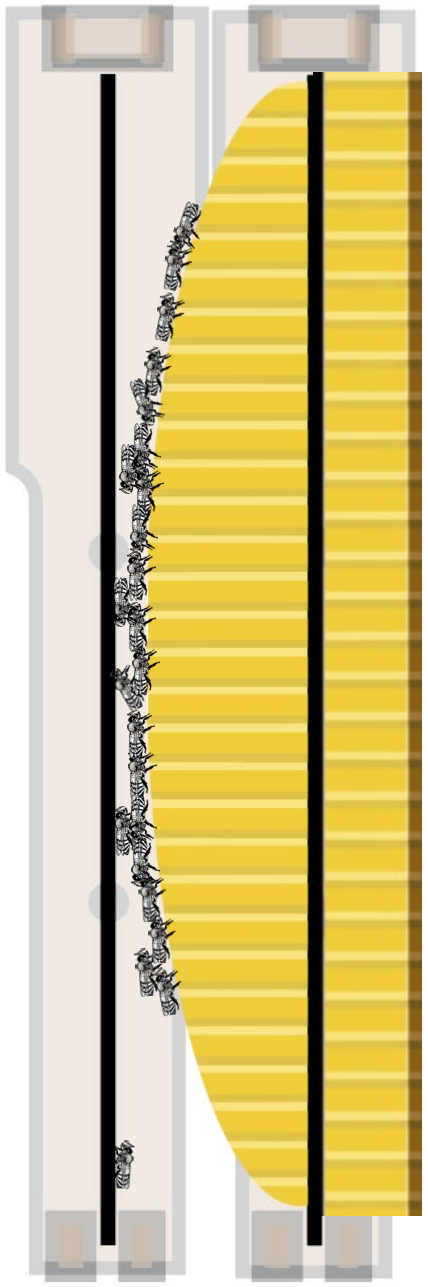


Mind the GAPS

- If you keep the frames pushed to one side, it could result in a gap between the first or last frame and the outer wall
- With the violation of bee space, the bees will attach errant comb to the hive box
- Avoid this by keeping your frames tight and centered
- Use a hive tool to push the frame together so the shoulders touch
- Even the space on both sides





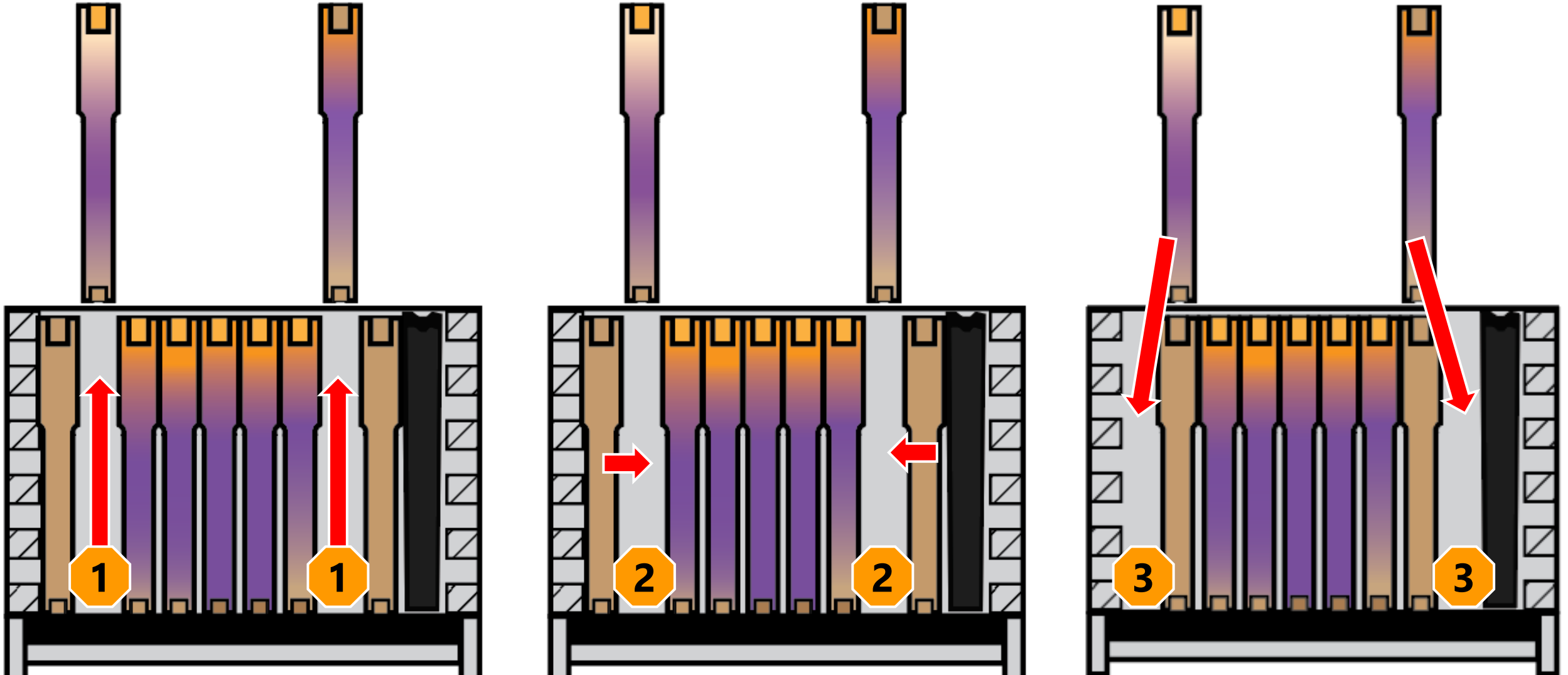


Excess Space, Limited Bees

- Toward the end of a nectar flow
  - Less population, less resources; the job slows down
- When there are fewer bees doing the job…
  - **No bees on the far side**
  - Bees will build without encountering bees on the other side
  - They will build into the empty space
  - Common on the outer frames*
  - Thwart this by placing frames next to built out frames

*Swapping Frame to the Interior

Setting bees up to build comb against comb. Also moving frames closer to the nest incentivizes bees to build comb



Building Wonky Blobs

Wax building in irregular blobs

- Sometimes wax building bees build on deposits
  - Other times the bees gather and build as a unit
- They might not have the heat to warm the space, so they build in an irregular manner
  - Often when you see this pattern there are too few bees, not enough heat, not enough resources, or a combination thereof



Building Wonky Blobs

Wax building in irregular blobs

- This can also occur when the bees strip the wax coatings off of frame surfaces
- As noted earlier, inspect for stripped coatings and fix the frames before this happens





Image credit: Reddit: vega6748

Missing Frame(s)

If you leave a frame out….

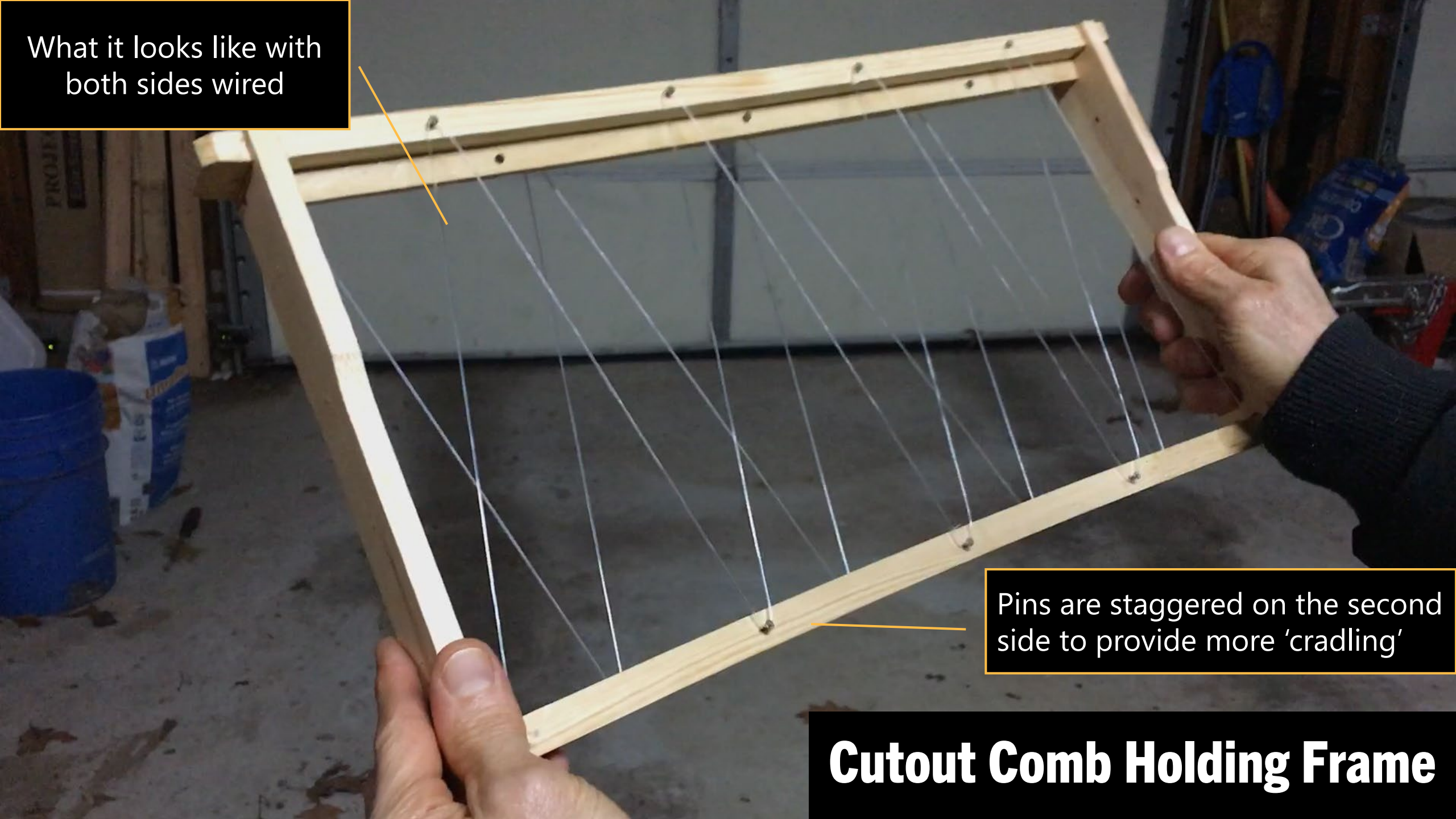
- Bees will build into the open available space
- They will attach comb to whatever is above
  - They could also affix the comb on things sitting alongside
- **Recovery:** Cut it out and rubber band it into a wooden frame

80-pound test Fishing wire



Pre ‘Wired First side. Second side pins in place, ready to be wired after comb is nested within.

Cutout Comb Holding Frame


What it looks like with both sides wired
Pins are staggered on the second side to provide more ‘cradling’
Cutout Comb Holding Frame

Bad Evil Things Happen With Slotted Frames



BEST PRACTICES

Foundation Storage

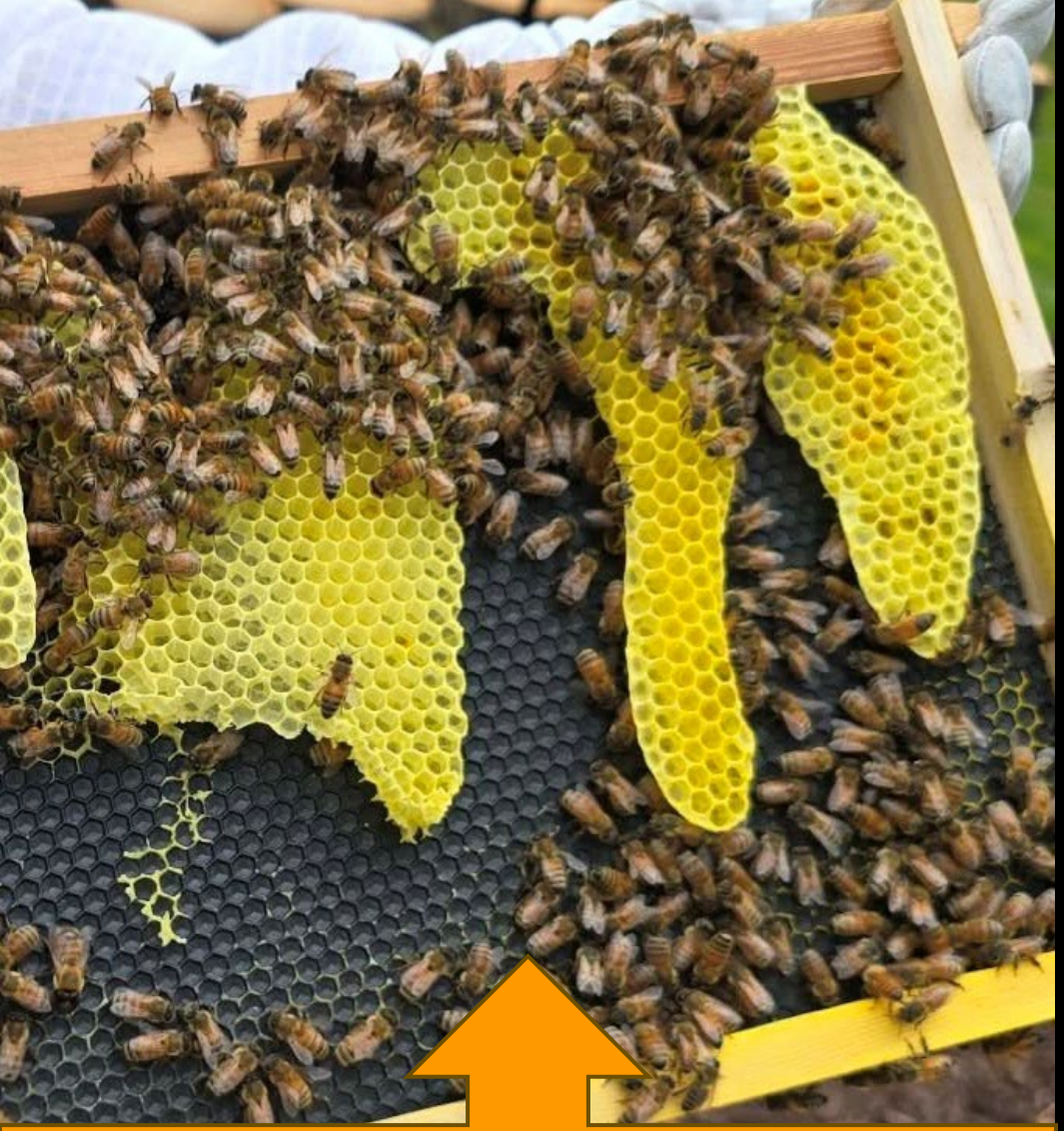
Store Foundation Well

- Keep it in a cool dry place
  - Make sure it is not near any volatiles that could taint it
- Use it as quickly as possible
  - The fresher the wax is, the more odor it maintains
  - Strong wax odor is more enticing to the bees
- Use care if using wax during cold conditions
  - It becomes very brittle when cold
  - Warm it up before use





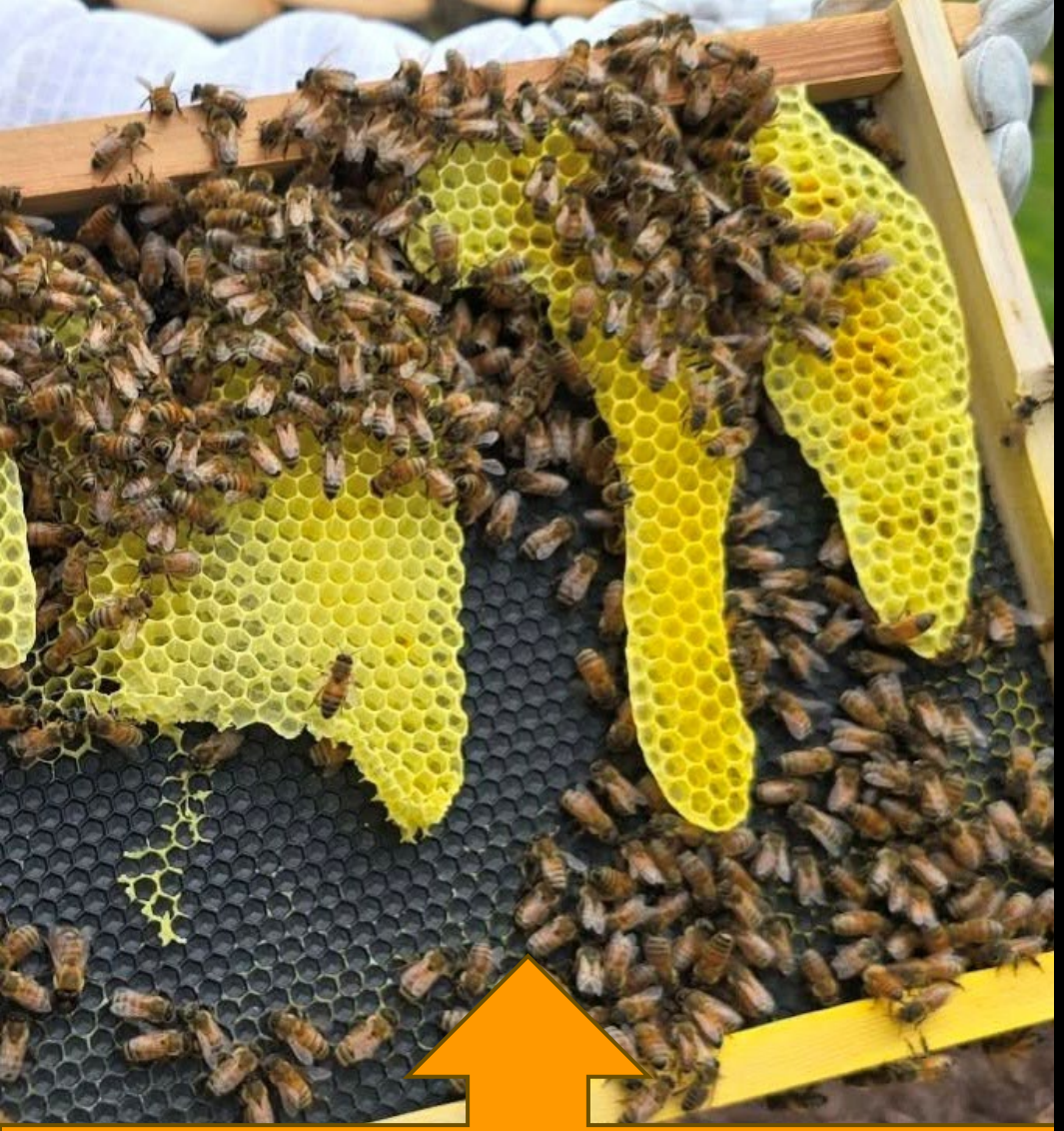
LET'S TALK ABOUT FIXING THIS



Fix Poorly Placed Comb

Scrape it off, Reapply

- Shake the bees off the frame
- Pull the frame and scrape off the errant wax
- Melt the wax and reapply it using one of the methods shown earlier
- Place it back into the hive – close to the brood nest



LET'S TALK ABOUT FIXING THIS

Fix Poorly Placed Comb

Set them up for success to rebuild

- Place the rewax frame against drawn comb on both sides
- Keep spacing tight and compact
- **Feed the bees**
- Confirm the colony is actively producing brood so there are wax making bees
  - Or put it in a colony that will is currently capable of building wax
- Keep things closed up so they can maintain the heat required for the operation



BETTERCOMB

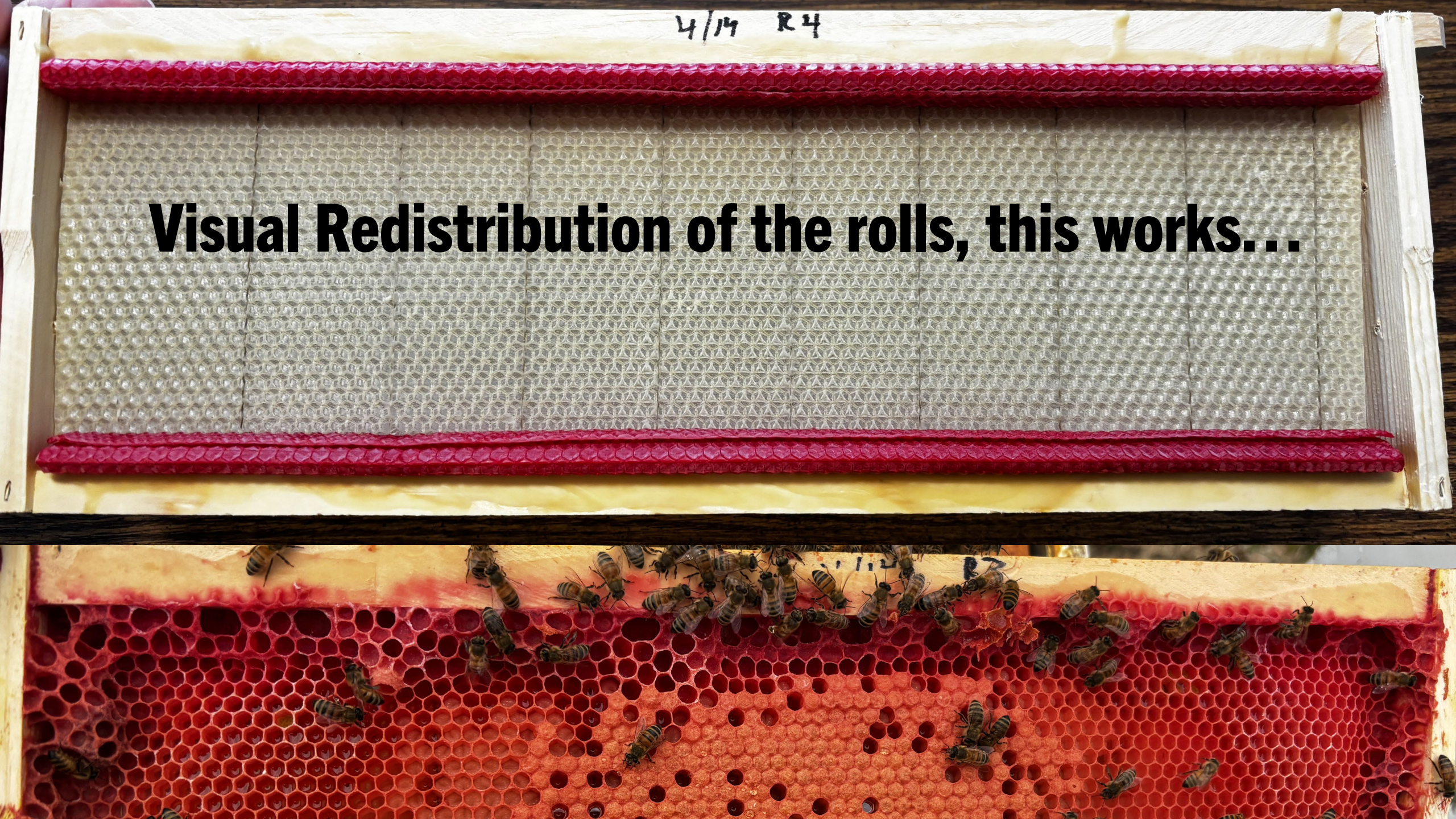
No longer being manufactured



Image credit: Virginia and Vicki | Pemi-Baker Beekepers Assoc.

The DAVID WADE APPROACH

Place foundation along the edges and let the bees repurpose the wax to build honeycomb – a great method to get frames drawn out for those times where bees are not drawing comb


4/14 R4
Visual Redistribution of the rolls, this works…




Inspect Regularly

Find and Correct Early

- Check for errant comb
- Catch and scrape off bad comb before it gets to far
  - Being proactive is efficient use of worker bee time
  - Do not let them get to far building comb that is unusable
  - You want them concentrating efforts on building good, usable comb





LIVE WITH IT

- Rotate bad ‘mostly usable comb’ to the bottom.
- Sort it out next spring when the bees move up



Control Heat

- Close off screened bottom boards
  - Insert bottom board plastic
- Keep entrances smaller with entrance guards
- Reduce ventilation to help keep heat in the interior chamber
- Work with bees trying to warm the space for wax production



Collect Errant Comb

Keep a zip-top bag

- Use it for rewaxing
- Reserve it for the David Wade Approach



Employ Nucleus Colonies

Workhorse Comb Builders

- Nuc colonies: Great at building comb
- Compact; Bees want to build wax for brood in their small space
- Michael Palmer talks about employing them to be **comb building factories**

It is ADVANTAGEOUS to use **POLY NUCS**

- Great heat control inside these boxes
- This one is 6 frames, which means more resources/workforce to build out wax
- It is compact with a top feeder above

Employ Swarms

Workhorse Comb Builders

- Prime Swarms are naturally stocked with wax building bees
- A swarm in search of a new home needs to build comb in the new location
- They tend to be very good at building out honeycomb

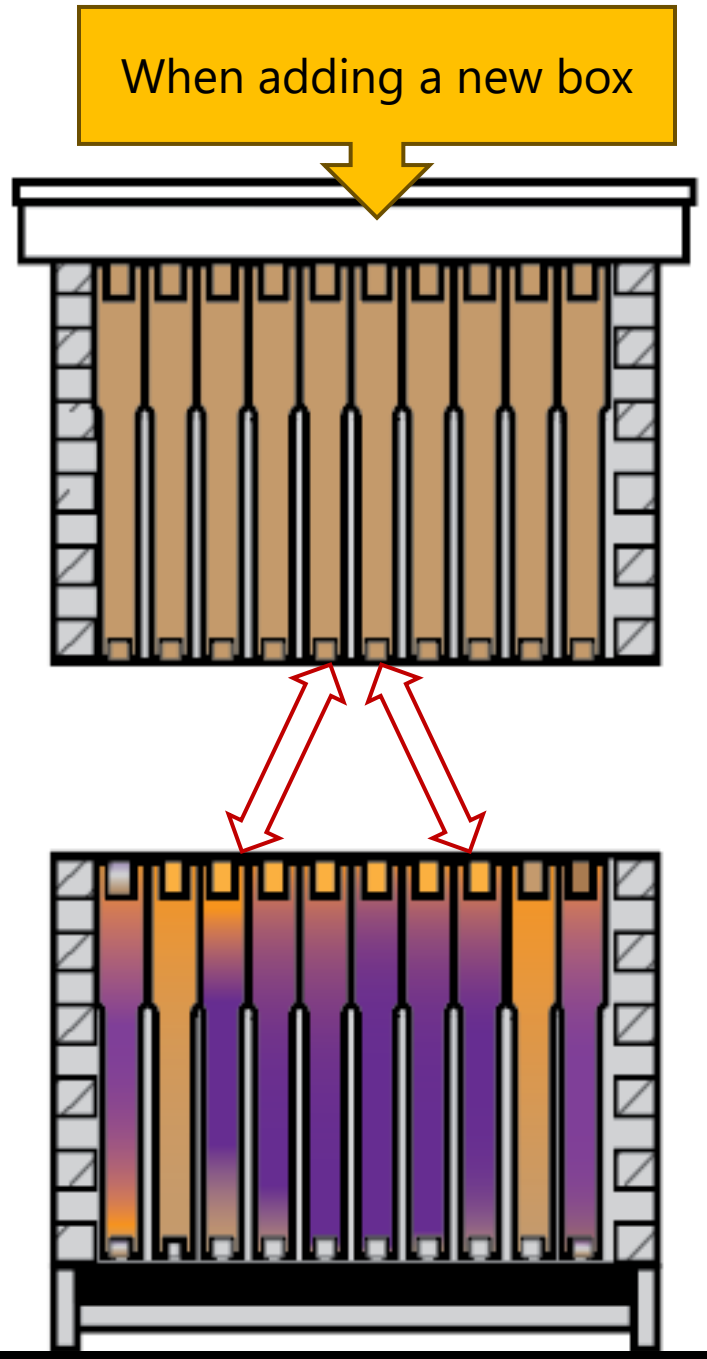


Feed Wax Building Bees

Continually Supply Food

- Keep feeding bees that are in wax building mode to extend wax creation windows
  - As summer comes, bees have heat, wax building bees, and resources (if you keep supplying them)
  - Feeding also keeps queens laying – this keeps the workforce going a little bit longer
- One to one sugar solution – *keeps it going*

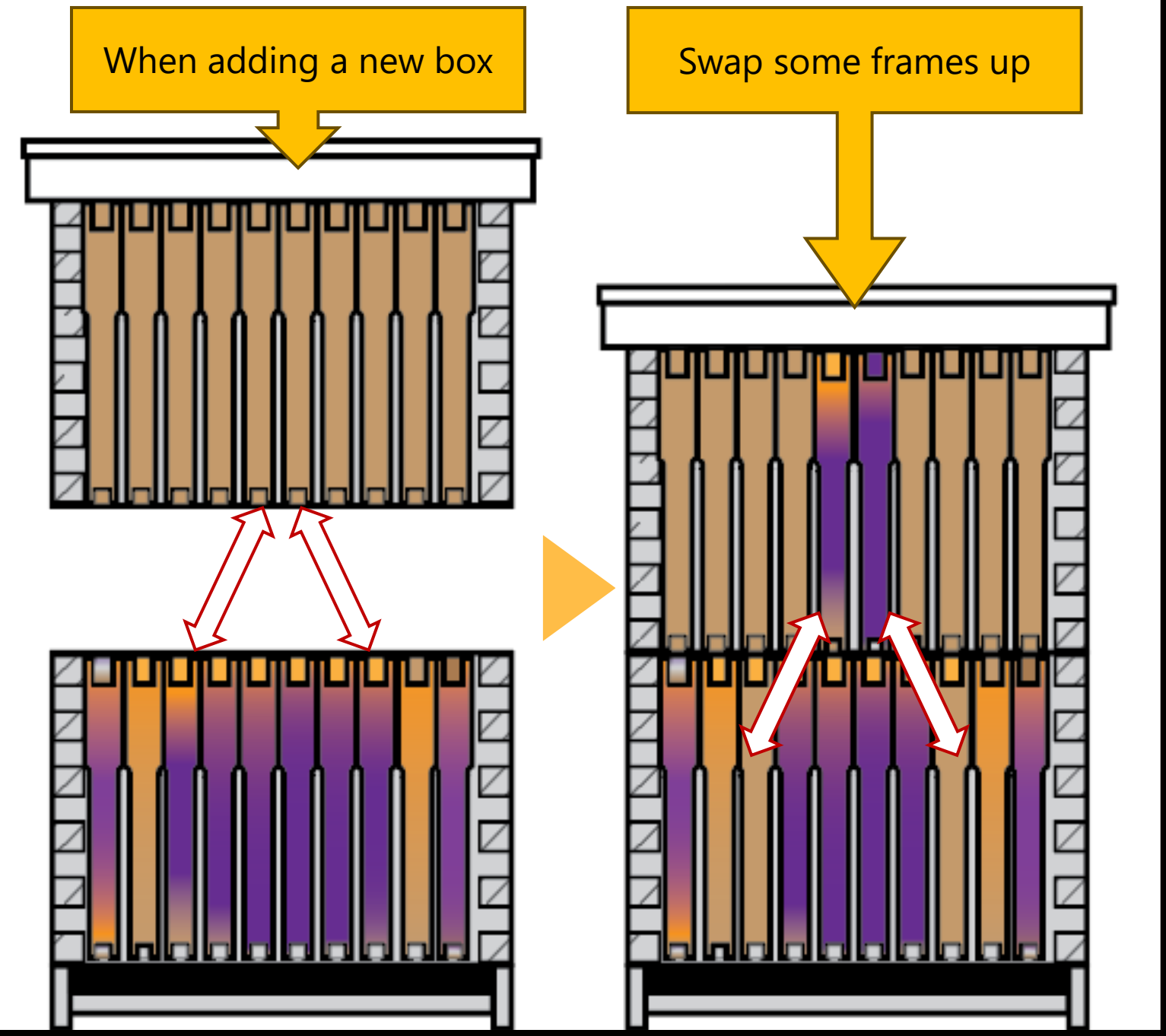




Moving to Two Boxes

Enticing Bees to Move Up

- Moving two of the brood frames up



Moving to Two Boxes

Enticing Bees to Move Up

- Moving two of the brood frames up
  - Center them over the bottom box
  - The two frames will draw the bees up into the second box
  - Note: Perhaps Overengineered as the bees will move up without this; but it seems to be a worthwhile practice

Be mindful of weather impacts to incoming resources. Example, **long rains thwart nectar gathering**



With a rain event, gather takes a pause, and this can hamper wax production – *consider feeding*

Keep Varroa Contained

Maintain healthy colonies

- Sick, unhealthy, parasitized bees, may not be up to the task of building out comb



Prep Foundation

Warm and Spray

- **Place frames in the sun** before inserting
- **Spray new foundation** with sugar solution
  - This introduces comb to worker bees – they come to clean it off
  - It doesn't hurt that they are consuming sugar solution either



Festooning

Bees ‘Festoon’ to build wax

- They hang in chains and this plays a role in drawing straight honeycomb



Image credit: TheBeeMD

Keep your hives level from side to side

Image credit: Gross Encounters of the Furred Kind

What are these?



Image credit: David Haslet Photo

www.bkcorner.com
THE Beekeeper's CORNER PODCAST

What are these?

Bee Stairs...

You often see these and formations on bottom boards

Bees uses these to walk up to the bottom bars of the box above

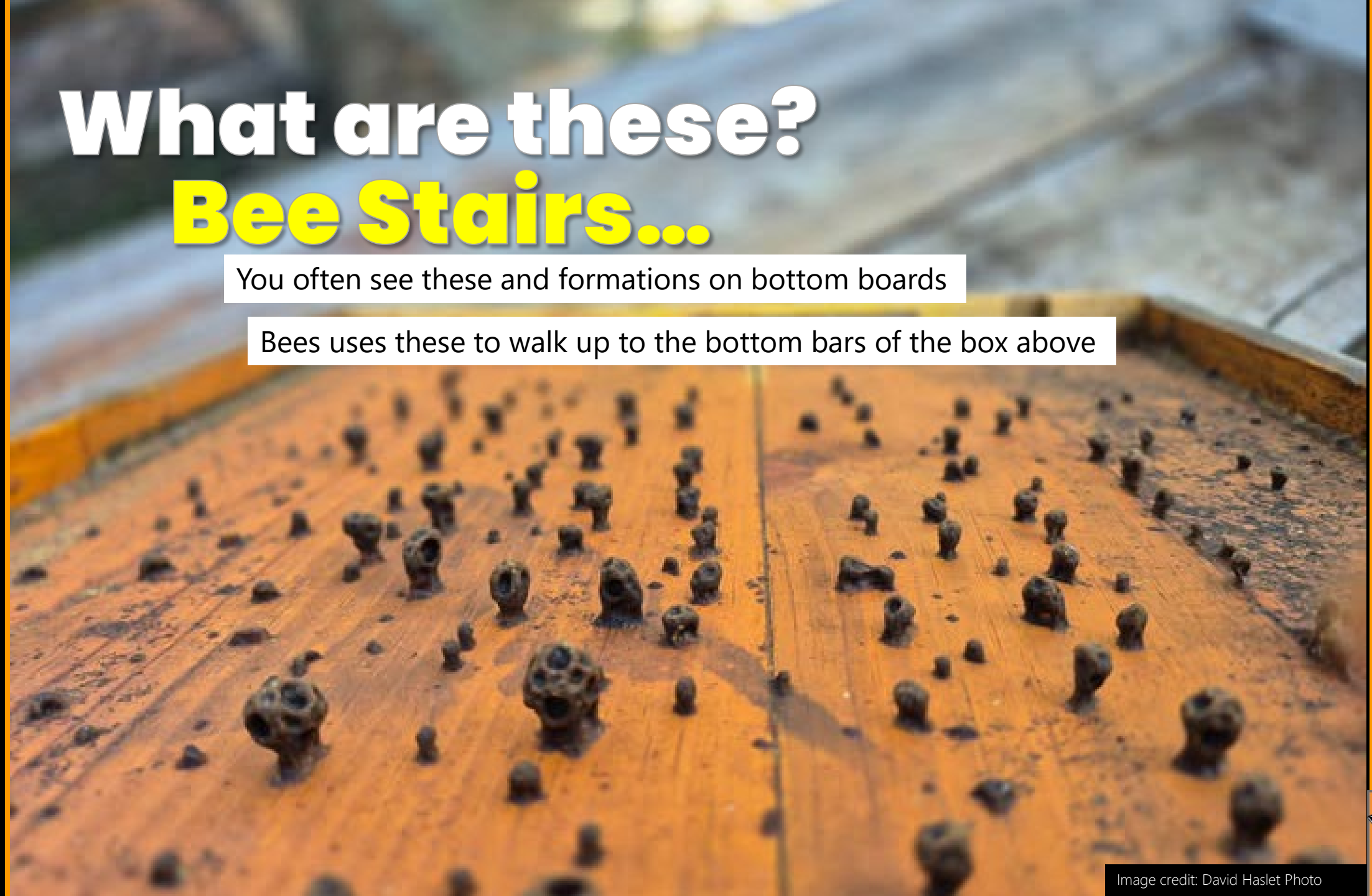


Image credit: David Haslet Photo

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THE Beekeeper's CORNER PODCAST

What is this?



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What is this?



Small Hive Beetle Jail...

Bees build these so they can coral small hive beetles against them

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Let's Review what we have covered

+RESOURCES

+POPULATION

+COMB ZONE TEMPS

+GOOD TECHNIQUES

+QUALITY FOUNDATION

+DUE DILLIGENCE

=IDEAL WAX FOR YOUR COLONIES

With a little bit of know how,
and understanding…

You can be successful in building
high-quality honeycomb
for the heart of the hive



QUESTIONS

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THANK YOU FOR YOUR TIME

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