SWARM PREVENTION

MID-STATE BEEKEEPERS ASSOCIATION

April 4th, 2019

INTRODUCTION – Kevin Inglin

- Past President – NWNJBA
- 10 year hobbyist beekeeper with 6 hives
- Work as an IT Architect for a pharma company in my day job
- Produce a beekeeping podcast as an another hobby. Beekeeper's Corner – www.bkcorner.org

SWARM PREVENTION – THE ANSWER

Begin with the end in mind

What | Cause | Why We Care & Prevention

- **What**
  - *Natural and Instinctive Behavior of Honey Bees to Reproduce*
- **Cause**
  - *Some condition has occurred, likely congestion, and space is needed for the colony to perform basic functions – store food, grow*
- **Why do we care and what can we do to prevent it**
  - *We do not want half of our honey force flying away at a bad time*
  - *Perform an action that gives more space*

AGENDA

Let’s cover the some details about swarming and ways to prevent your bees from flying away.

Agenda

- Swarm Background and Types
- Swarm Timing
- Swarm Triggers
- Colony Management to Prevent Swarming

Swarm Background and Types

Foundational basics about swarming types and timing

What is a swarm?

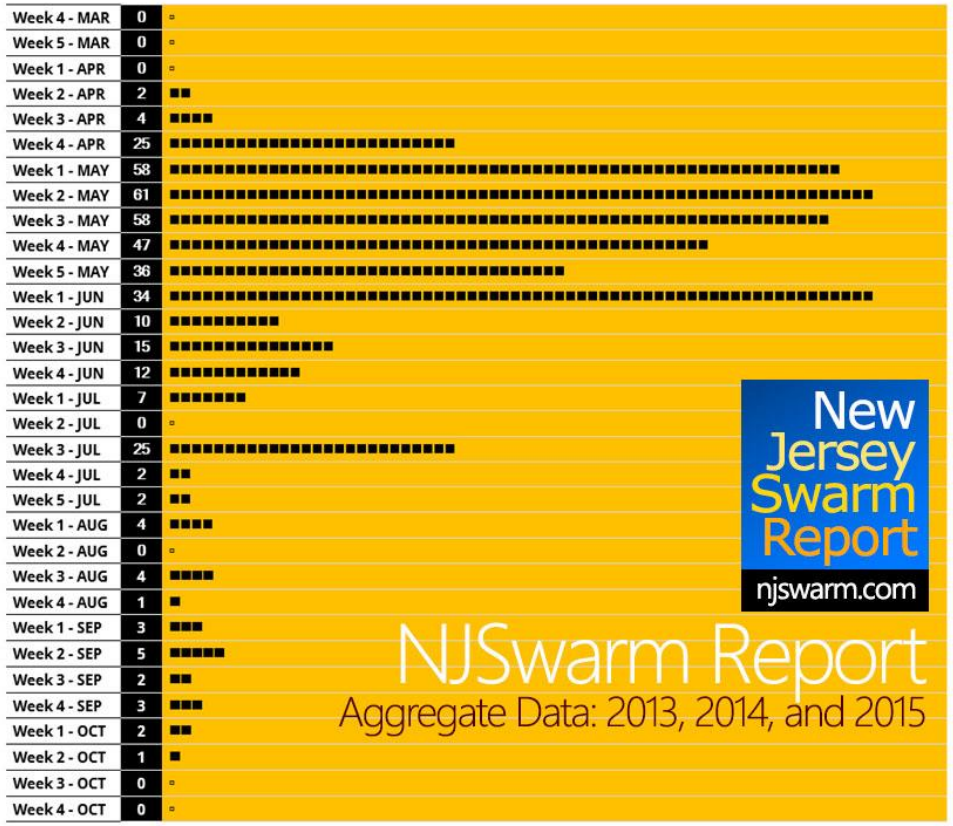
- **Natural and Instinctive Behavior of Honey Bees to Reproduce**
  - *Colony growth is by the individual bee*
  - *Colony survival is through the reproductive swarm*

Swarm Types

- **Reproduction "Prime" Swarms**
  - *Natural and instinctive behavior of the honey bee colony to reproduce.*
- **"After" Swarms**
  - *After an initial swarm leaves the hive still has swarming pressure so it issues more swarms.*
- **Late Season Swarms**
  - *For "some" reason a subset of the colony decides to leave to re-establish a home.*
- **Absconding ~~Swarms~~**
  - *Not really a swarm type… Something often does not suit the colony and the colony leaves*

Swarm Timing

- **April 15th through July 15th**
  - *Data from NJ shows the common swarm season begins 4/15*
  - *Can be impacted by: weather, elevation, forage, size of colony*



- **Swarms timing will follow biology**
  - *Swarms will cast off only if certain biological occurrences have occurred in the hive*
    - Appears of drones, food for the colony to sustain, brood to take over the operation, replacement queens underway

Signals: Drones and White Wax

- **Drone Appearance**
  - *In order for a colony to requeen, there has to be drones.*
- **White Wax**
  - *Bees will signal a nectar flow with the presence of new, fresh, white wax.*
    - In abundance, you will see it on the top bars and other places in the hive.

These two occurrences, as they relate to timing, are the signals that the games have begun; swarm season is now in play.

Swarm Timing: Not Spontaneous

- **Hives do not simply up and swarm**
  - *Timing wise, swarms are forecast in advance*
  - *Triggers forecast swarming: capped queen cells for example.*
  - *The colony is often making preparations **10 to 20 days in advance** of the actual issuance of the swarm.*
    - If you know what, and take action in time, you can likely stave off a swarm.
    - However, sometimes swarms are going to swarm for the purpose of swarming
      - And nothing you do is going to matter.
      - Maybe you missed something, or maybe it is genetics. Sometimes prevention is a misnomer.

Another way of looking at timing

- **Swarming often begins from the fall**
  - *Large quantities of health bees in the fall manifests in strong colonies in the spring.*
  - *Especially with a vibrant spring colonies take advantage of a spring nectar flows and pollen availability.*
- **Older Queens**
  - *Older queens from the previous year also play a role*
    - Young queens are said to be less 'swarmy'. Colonies are happy with younger queens.

RECOGNIZING SWARM TRIGGERS

Conditions in the hive that can set off swarming instincts

What is a trigger?

Trigger: Condition that incites an action

- Swarm Triggers, The list
  - *Crowding, both bees and resources*
  - *Worker motivations – and queen signals to the workers*
  - *Chemical communication breakdown*
  - *Genetics*

Crowding as a trigger to swarming

- Crowding comes in two forms:
  - *First is a simple over abundance of bees.*
    - In the case of abundance of bees, vertical bees emerging from the cells become horizontal bees on the face of the comb.
    - **Abundant stores** with **no place to put them** = **swarming**

Crowding as a trigger to swarming

- Crowding comes in two forms:
  - *Second is a lack of space to work;*
    - Lack of space for the queen to lay eggs
    - And/Or no place to store incoming resources
      - If there are no cells to store nectar outside of the brood area, bees will use the brood area and the queen will have no place to lay eggs.

Crowding and the Queen

- **The queen avoiding the bottom of the hive**
  - *If a hive is really active, and congested, the queen will not police the bottom of the brood chamber due to all of the coming and going.*
    - When her presence is not there, workers are free to build queen cups
    - It is speculated that in less crowded conditions her presence might thwart this activity.

Worker Motivations?

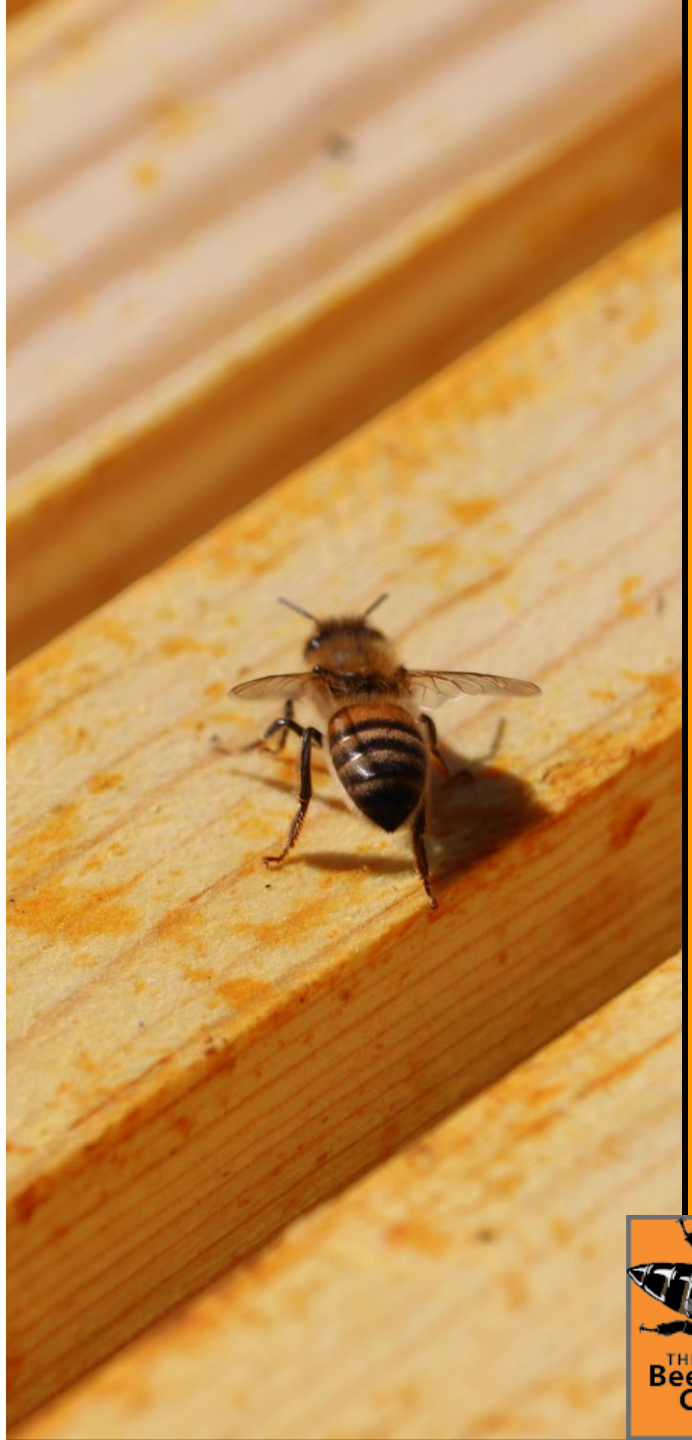
One takeaway: a colony is a complex eco system in which **the queen doesn't necessarily drive all of the decisions.**

❑ Workers messing up the program?

- *Sometimes it is observed that even if you provide proper supers with drawn comb the bees will fill the brood nest anyway.*
  - Some speculate hive crowding, or even eagerness at the abundance, prevents foragers from going up to the storage area you provide so they drop it off in the brood nest.
- *Workers know things that influence colony outcomes?*
  - The Outside World - forager bees have been outside the hive and know the conditions.
  - Workers can sense how old the queen is and they know the quality of the offspring she's producing.
  - They also know the ratio of bees being produced - drones to worker bees.

Work Motivations: Idle Bees

- **Foragers return to the hive full of nectar and there is no place to put it.**
  - *Since there is no place to place the nectar, they hang around waiting for things to change. These idle bees cannot return to foraging.*
- **Unemployed Bees**
  - *There is an idea that with significant congestion, some bees are unemployed. Bees hanging around with nothing to do have to go.*



Worker Motivations: Queen Pheromone

- Queen Pheromone helps to keep the hive operating cohesively.
  - *The bees in the hive come in contact with the queen and distribute the pheromone throughout the hive.*
    - Queen pheromone suppresses worker ovary development and worker impulses to swarm.
    - The distribution of the queens pheromone among other things demonstrates she has a presences and inhibits the colony from building queen cells.

No Room for Eggs

- **What causes a queen to lay in queen cups?**
  - *Why would she do it?*
  - *What if she simply ran out of room?*
    - All cells on the face of the comb are full
    - And with no place to lay eggs on the face of the comb, a queen cup is as good a resource as any

Swarmy Bees

- **Certain races of bees have a propensity to swarm more often or conditions contribute to swarming**
  - *Carniolan (Apis Mellifera Carnica) bees are one of the bee races that are said to swarm more often then other types of bees.*
  - *Rumor has it that Russian bees are also quote un quote swarmy*
    - The truth is they build up quickly and if beekeepers do not pay attention, they get to swarm strength quickly and in the trees they go…
  - *It is genetically in the disposition of some bees to swarm more often.*

SWARM INDICATORS

Indicators for you that swarming potential exists in the hive

What is an Indicator?

Indicator: Signs that swarming has potential

- Swarm Indicators, The list
  - *Congestion: To many bees, congested brood nest and storage*
  - *Queen Cells: Cells that have royal Jelly*
  - *Early Season Appearances of: Drones and White Wax*
  - *Queen State: Age and Appearance*
  - *Worker Behavior - Listlessness*

First, what do they need?

- A Healthy Hive
  - *Nature demands that it be a working, established, colony*
    - "Runty hives" do not swarm, they build for survival
- Daughters to replace the queen that leaves
  - *To be clear, the long standing queen leaves with the swarm*
    - She leaves the hives to her daughters
- Bees to go….*made up of a mix of ages*
- Bees to stay….*to keep the operation going*

Queen Cells; Capped or with Royal Jelly

- **Queen Cups with Royal Jelly**
  - *The mere presence of queen cups is not an indicator.*
- **Capped Queen Cells – Queen replacement underway**
  - *Time of year taken into consideration of course*

Congestion
Bees and Hive

- **Hive Congestion**
  - *Lack of room to lay eggs*
  - *Lack of room to place food*
- **Abundance of Bees**
  - *Overcrowding of frames*
  - *Unemployed bees*

Queen State and Appearance

Queen Age

- *Younger queens have less propensity to swarm*
  - Queens grow old and lose their vigor. Two keys are lower egg production and less pheromone.
  - When you have an old queen, the logical answer is to replace her with a more vigorous one.

Queen Appearance

- *If you could be observant enough to see this you might encounter that:*
  - The queen slims down and is kept from laying an abundance of eggs.
  - This can be observed by a difference in brood patterns

Hive lethargy

- **The observed slowdown**
  - *Prior to swarming, the bees that will leave with the swarm need to prepare*
    - They will knock off activities to rest and gorge on food
  - *If you could observe:*
    - The hive will be less productive in the period preceding a swarm

SWARM MANAGEMENT

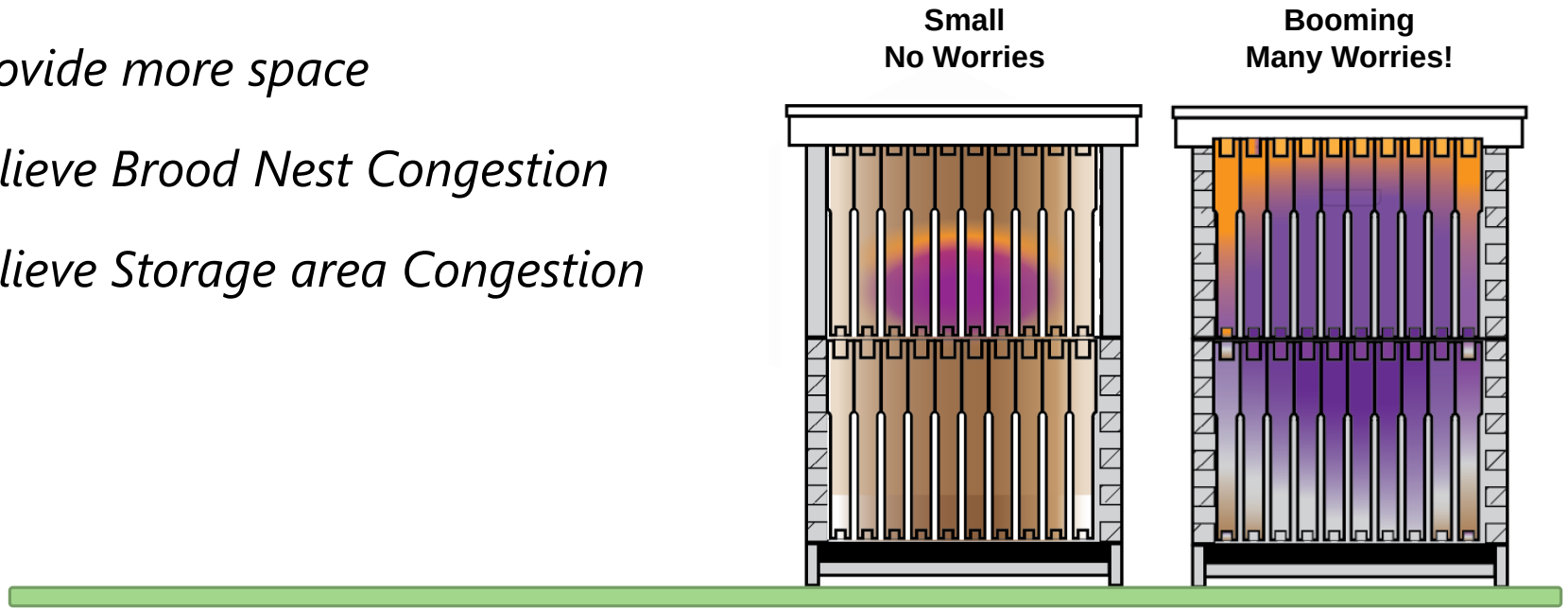
PREVENTION OR DEALING WITH IMMINENT SWARMS

Swarm Prevention Window

- For a large colony…
  - *Reminder that swarming typically comes some time after drones appear.*
- Consider drones being raised the first marker
  - *Drones signify a time when queens could lay eggs for their replacement* ***because mating is possible****.*
  - ***This window when you have to pay attention*** *because….****Eggs in a queen cup are a turning point***
    - You have to consider that in window of 21 days queens could emerge to replace your queen – *more on this shortly*

Preventative Measure Options

- During the window you will want to take action if you are in jeopardy of your hive swarming
  - *Look at the colony profile*
  - *Provide more space*
  - *Relieve Brood Nest Congestion*
  - *Relieve Storage area Congestion*

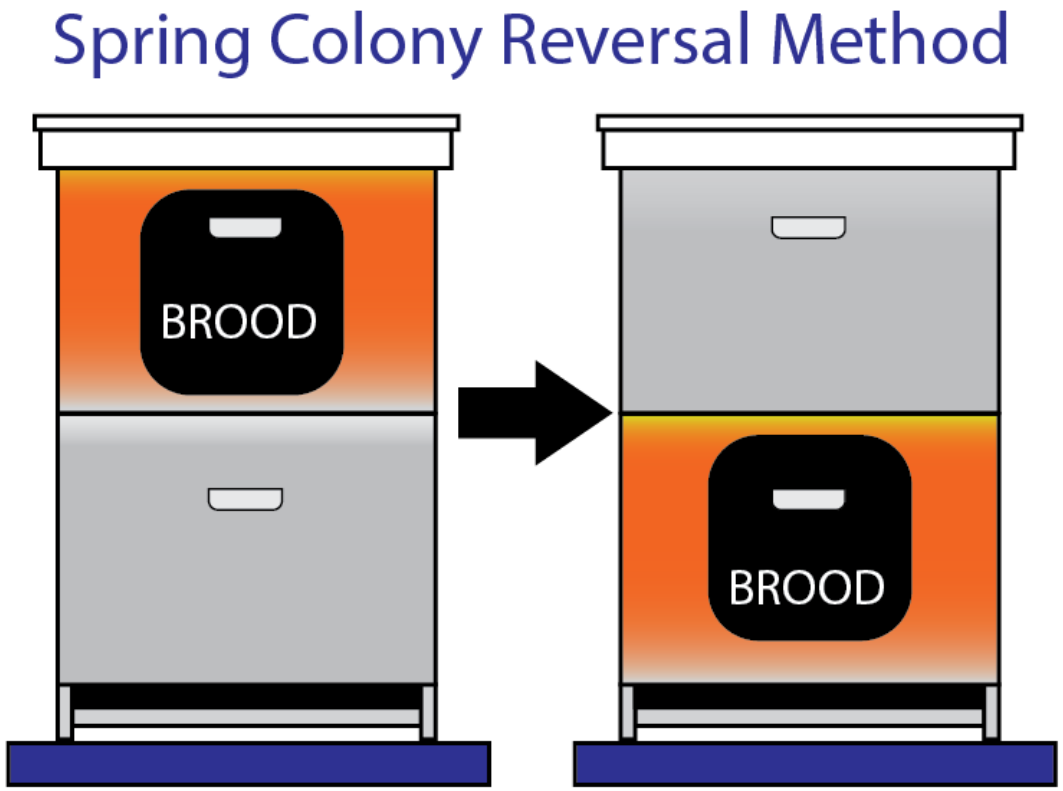


A programming note

- I am about to go through a lot of techniques
  - *Inevitably when I give this talk, someone in the audience will tell of a technique that can be used*
    - For the sake of being thorough, and because someone will share, I will speak to many options. Please bear with me, I'll make it educational.
  - *I will show you a lot of things,* ***and then tell you what to do***.
    - Do not be dismayed, just sit back, relax, think about the reasons that all of these methods exist, and the pros and cons of each.

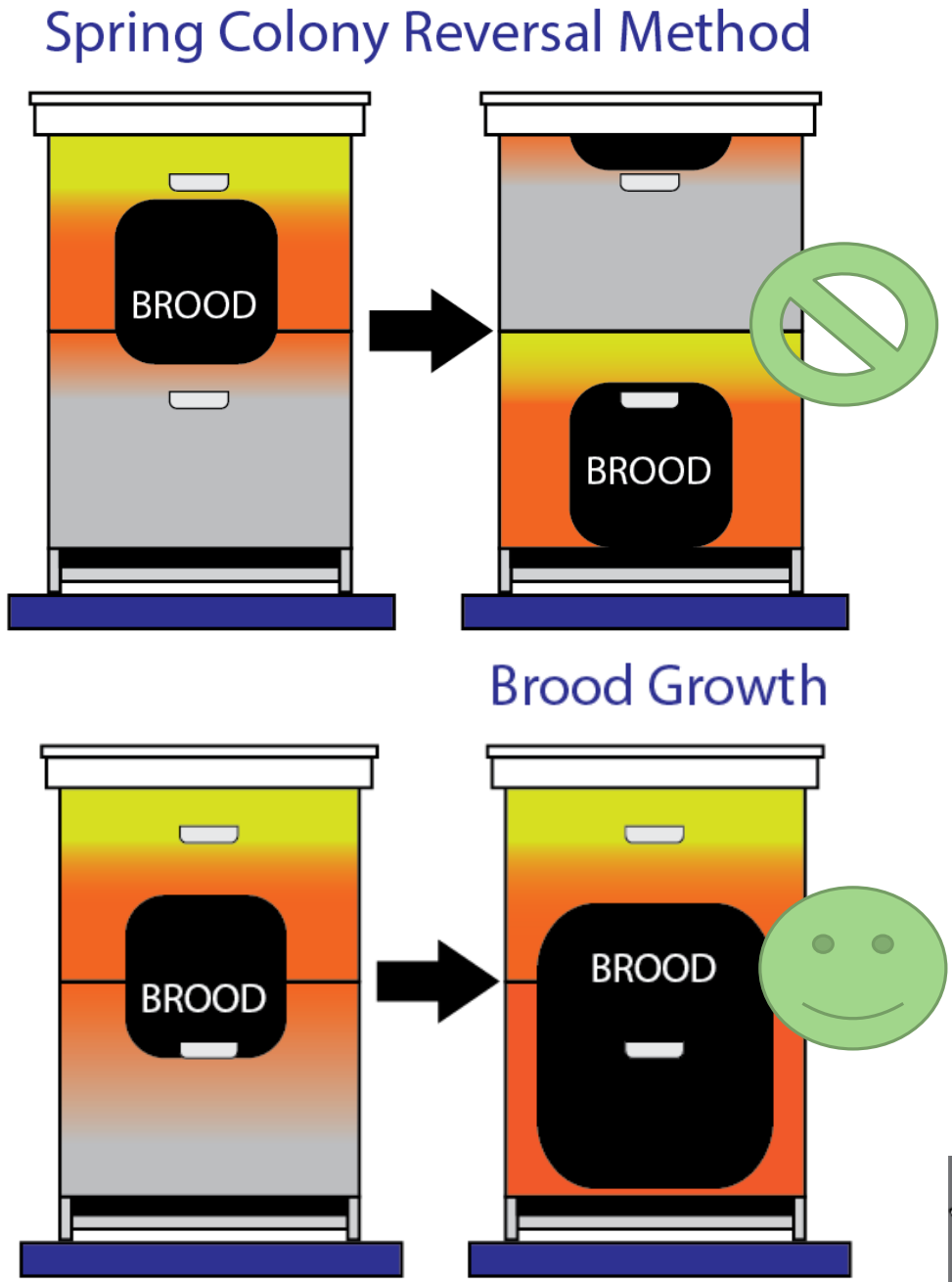
Spring Colony Reversal

- "Bees build up"
  - *There is a common lament that bees build up*
    - I think it has merit for describing new hive growth
    - And it gets applied to relieving congestion
    - Hence the technique to do a spring reversal.



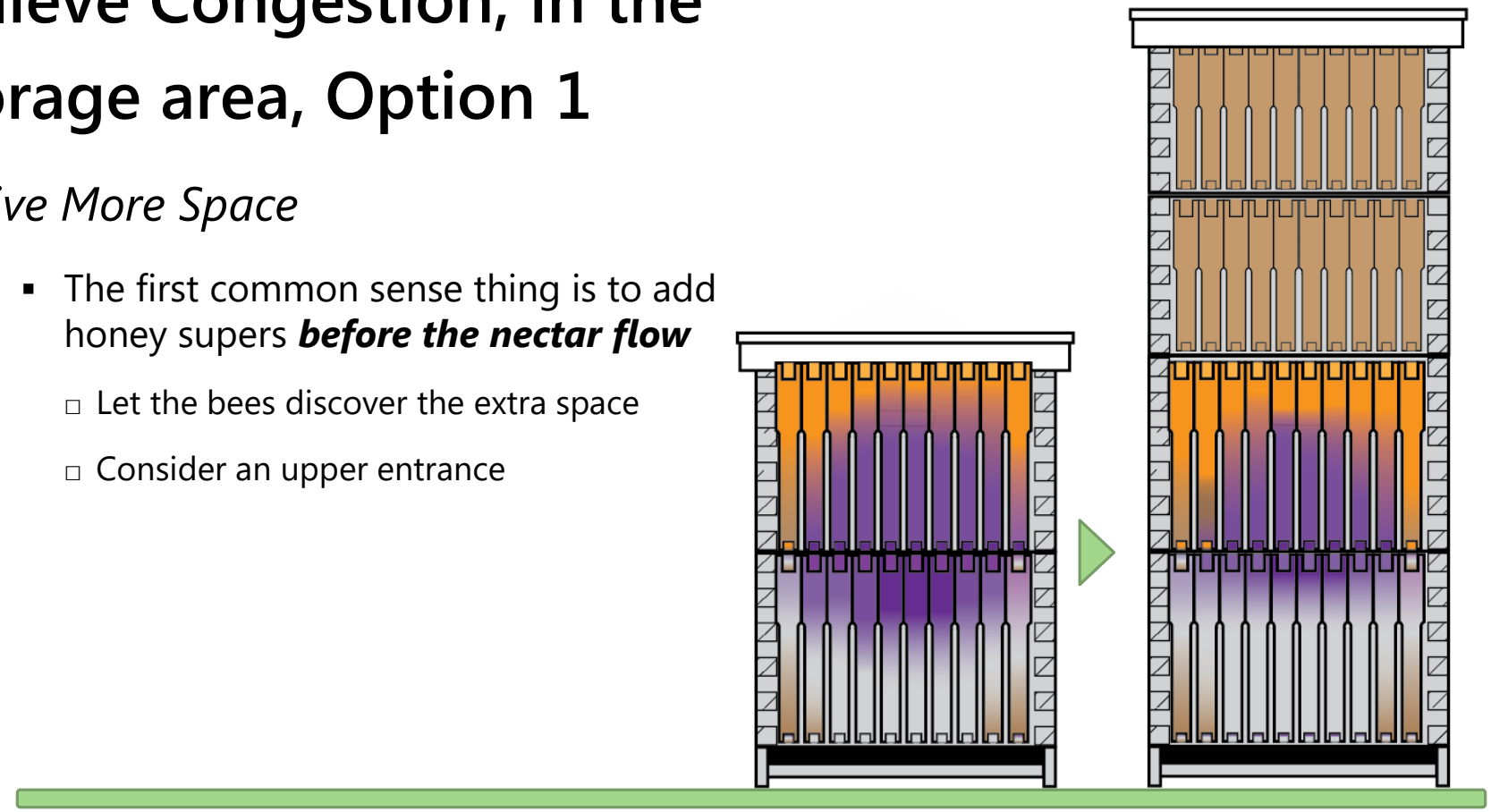
By the way…

- **Don't do this**
  - *You'll doom part of the brood*
- **Let this happen instead**
  - *Simply let the grow to occupy the space.*



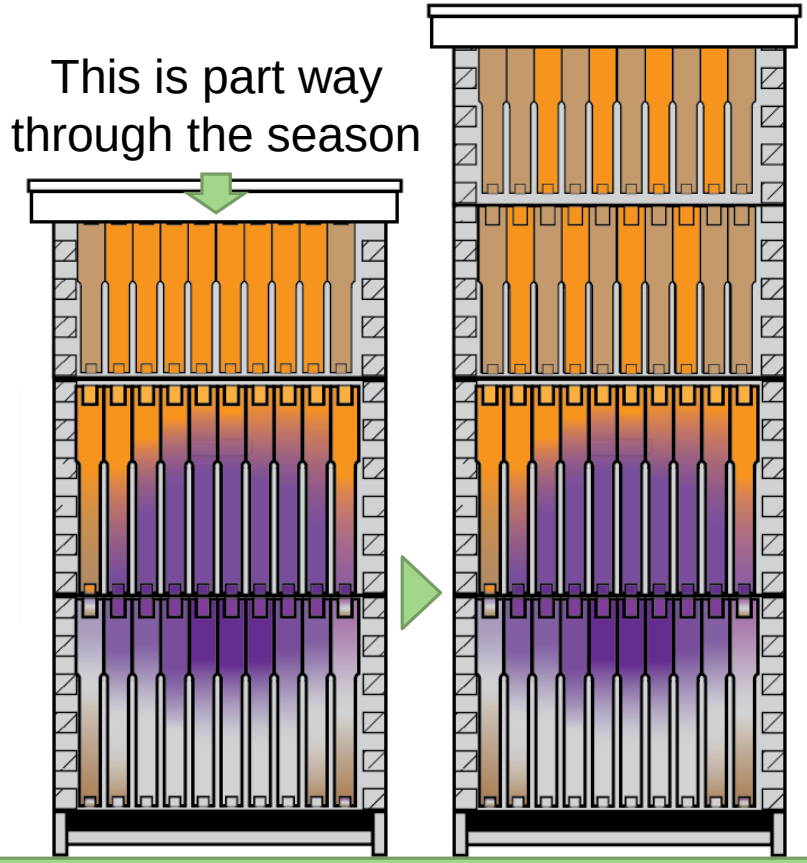
Preventative Measure: More Boxes

- **Relieve Congestion, in the storage area, Option 1**
  - *Give More Space*
    - The first common sense thing is to add honey supers ***before the nectar flow***
      - Let the bees discover the extra space
      - Consider an upper entrance



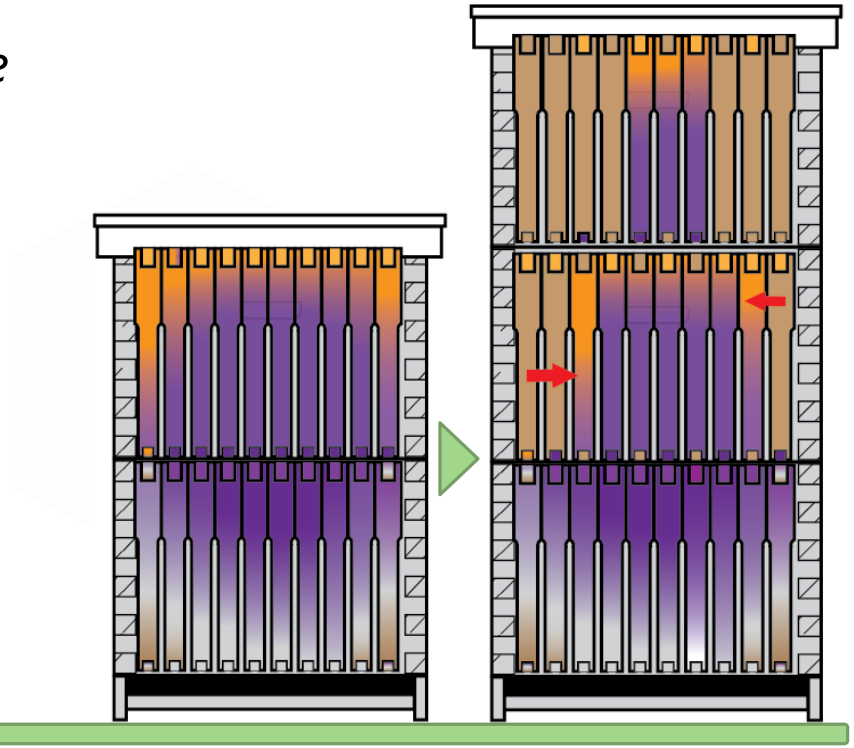
Preventative Measure: Checkerboarding

- **Relieve Congestion, in the storage area, Option 2**
  - *Open up the honey dome*
    - Add a box in spring. Let them fill it.
    - When it is mostly full, add another box
    - Move every other honey frame up
    - This gives space for colony to store more food, and enticement
      - Consider an upper entrance



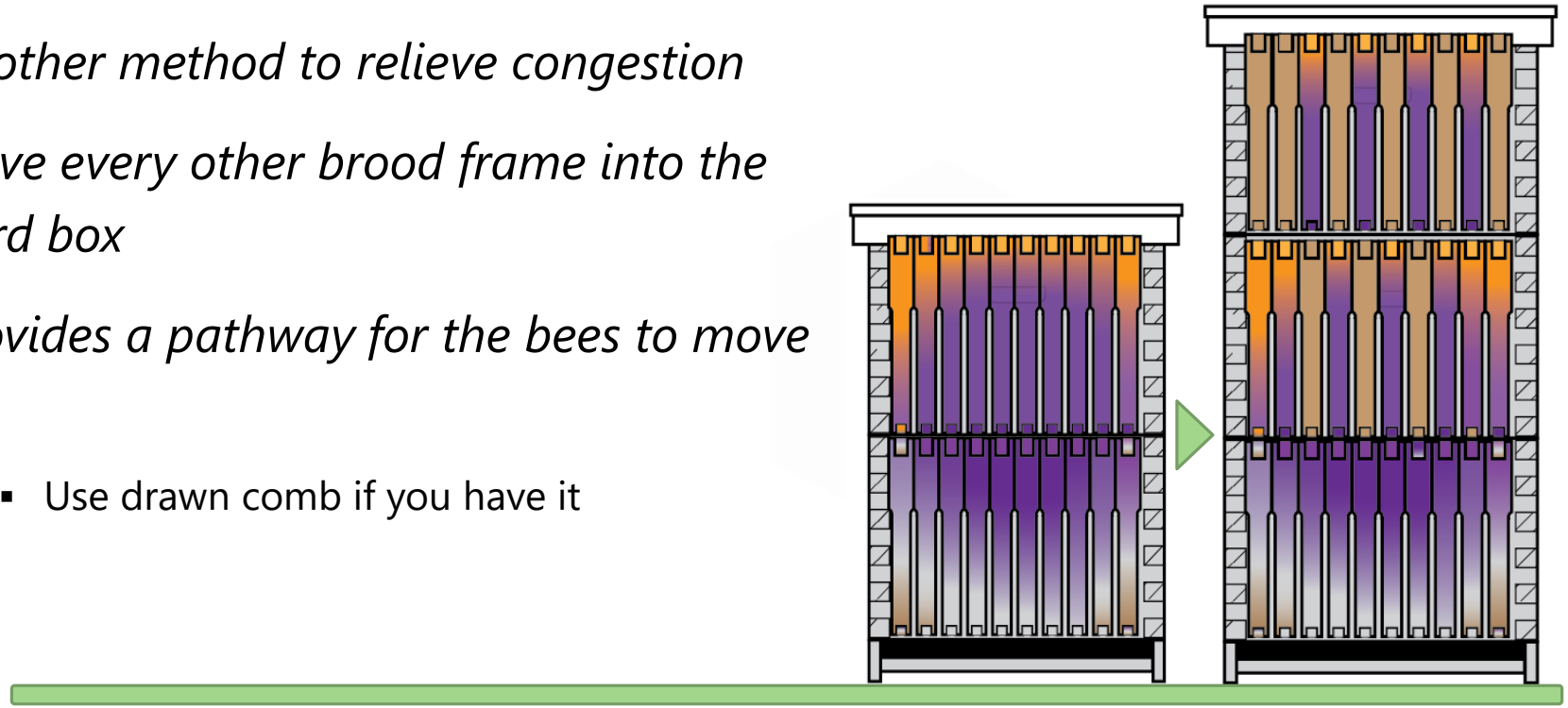
Preventative Measures: Pyramid Up

- **Relieve Congestion in the nest, Option 1**
  - *Relieve congestion in the nest and give space for the queen to lay*
  - *Add a box and move frames into a pyramid shape*
  - *Room for colony expansion into three boxes*



Preventative Measures: Expand

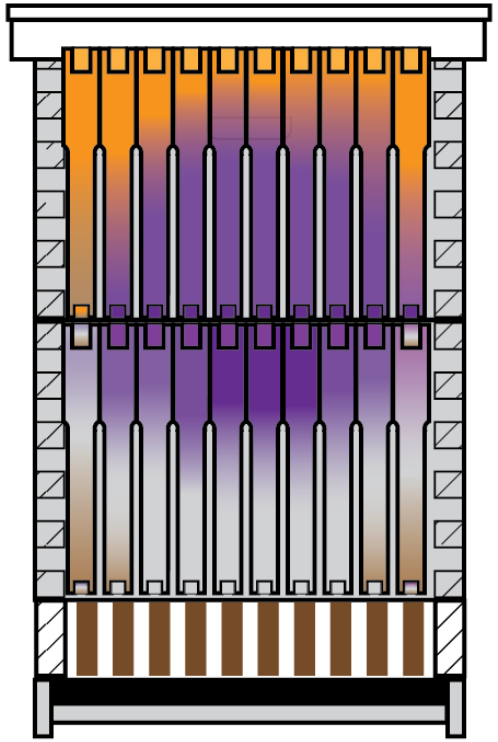
- **Relieve Congestion in the nest, Option 2**
  - *Another method to relieve congestion*
  - *Move every other brood frame into the third box*
  - *Provides a pathway for the bees to move up*
    - Use drawn comb if you have it



Preventative Measure: Slatted Rack

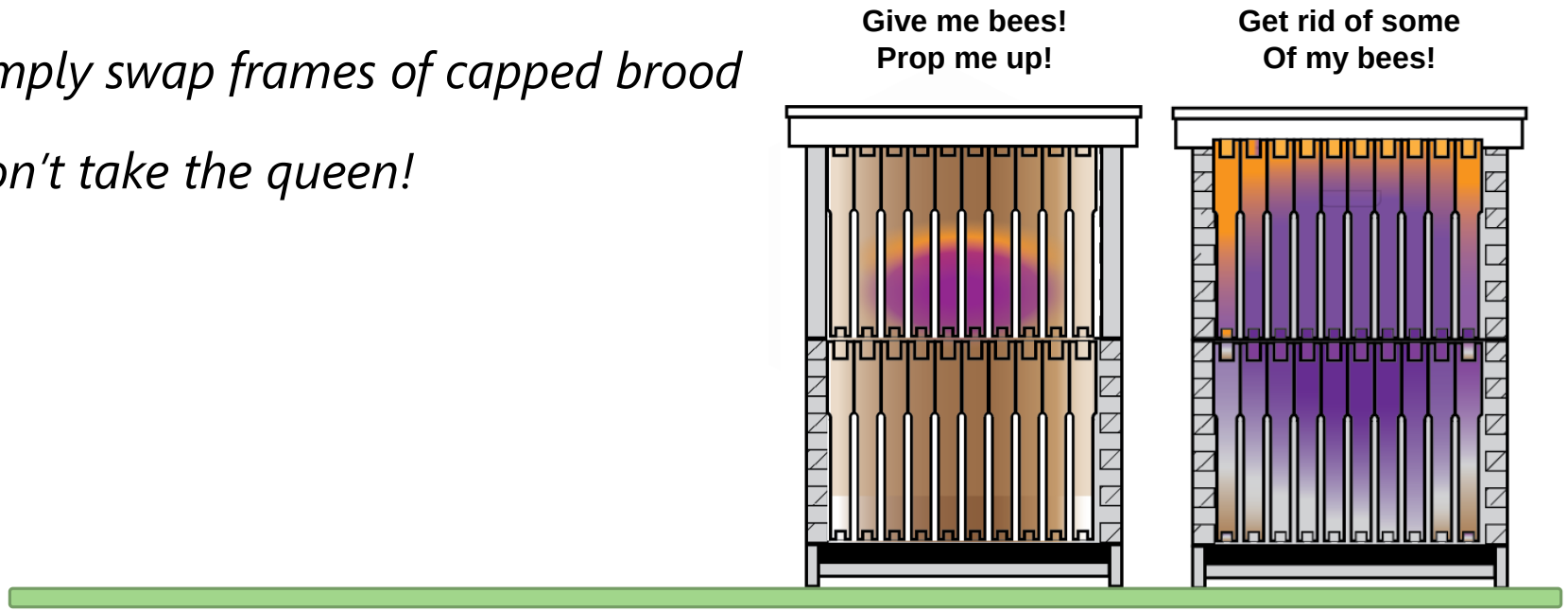
- **Slatted Rack to relieve congestion**
  - *Not a commonly employed device*
  - *Allows extra space in the hive for bees to accumulate and hang out, off of the frames*

< Photo Credit
GloryBee.com



Preventative Measure: Equalization

- You could exchange frames between these two hives and prop up the small one while diffusing the big one.
  - *Simply swap frames of capped brood*
  - *Don't take the queen!*

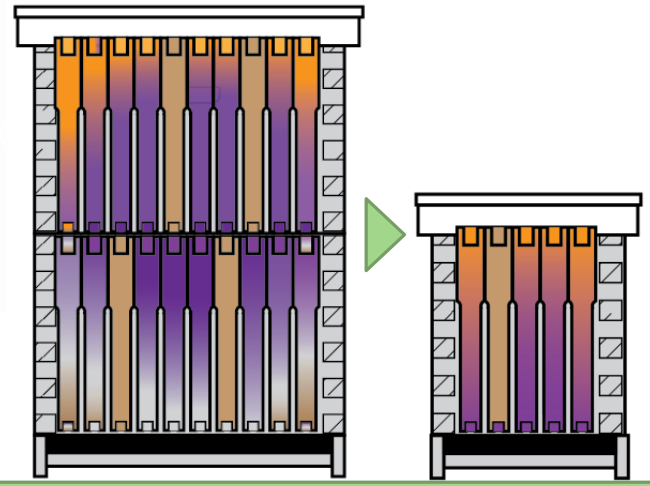


Preventative Measure: Do not overfeed

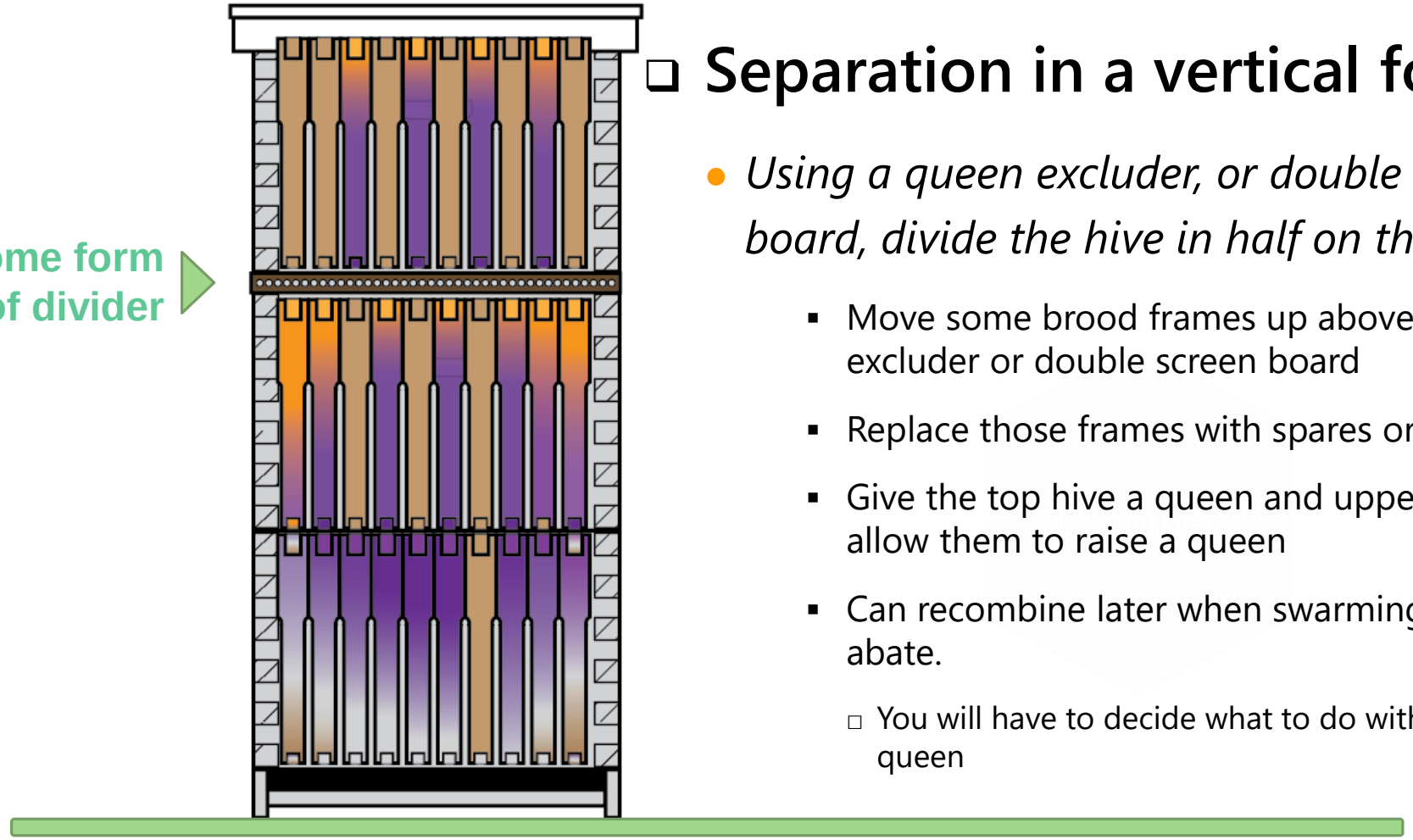
- **Sometimes beekeepers want a good start**
  - *Overfeeding causes hoarding and backfilling of the brood area.*
  - *They get too good of a start and it can lead to massive populations*
  - *If you are stimulating the colony in the spring, you best have a plan to cope for success*

Preventative Measure: A divide / split

- **Split (aka divide): Pull five frames out**
  - *Make a separate Nucleus colony*
  - *Replace frame removed from the origin colony with drawn comb*
    - No Drawn comb? Place all active comb toward the center of the origin hive, and put foundation to the outside.
    - Ok to put one or two foundation frames in the middle of the drawn frames to have the build comb for you and keep them occupied
  - *For the split (Nuc)*
    - 2 Brood, One Honey, One with Pollen
    - Take the queen to the Nuc, just like nature



Vertical Separation



- **Separation in a vertical format**
  - *Using a queen excluder, or double screen board, divide the hive in half on the stack.*
    - Move some brood frames up above a queen excluder or double screen board
    - Replace those frames with spares or foundation
    - Give the top hive a queen and upper entrance or allow them to raise a queen
    - Can recombine later when swarming pressures abate.
      - You will have to decide what to do with the second queen

Damn It! I am more confused than before

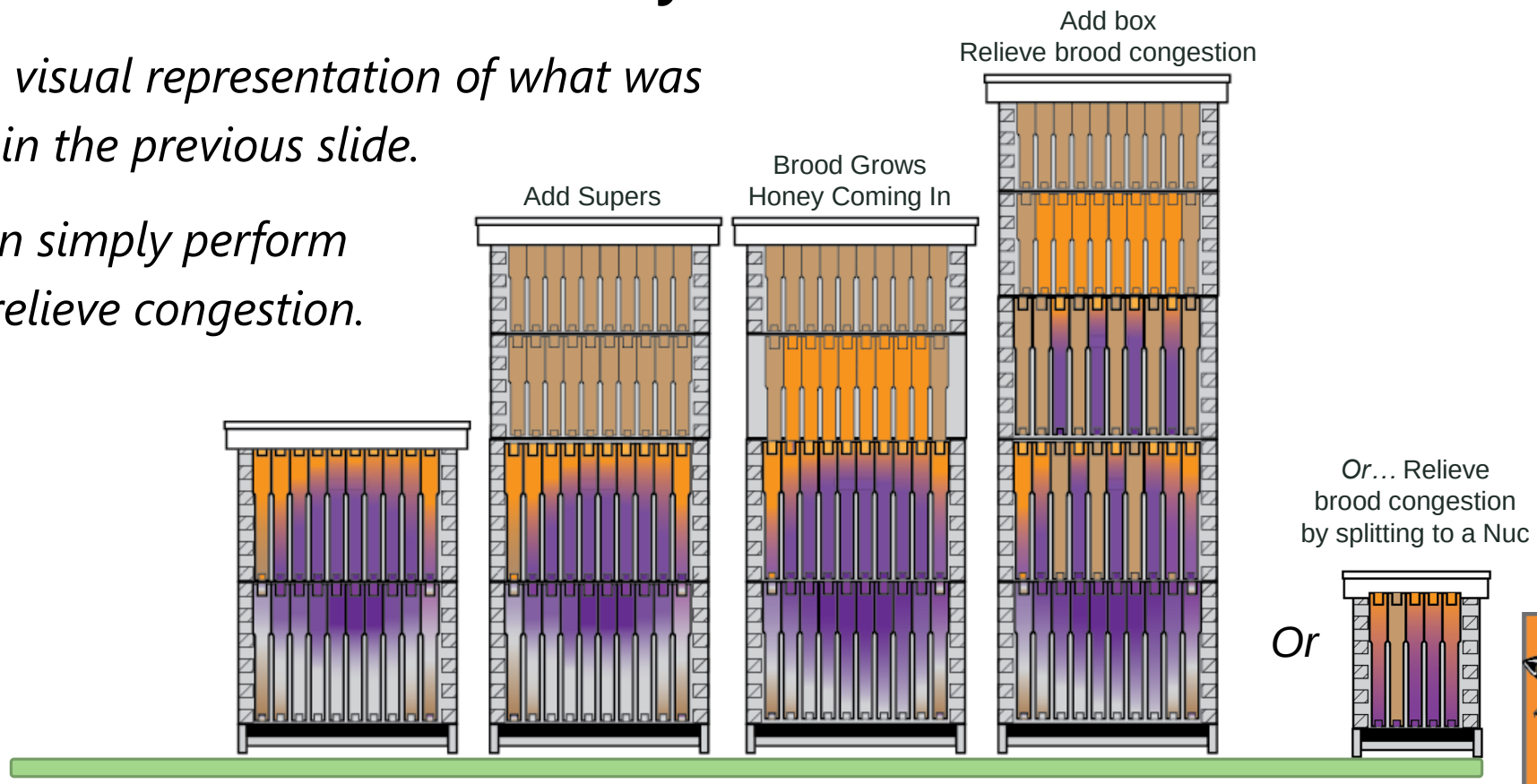
- **You told me 25 options and I don't understand what I should do!**
  - *Add honey super boxes early*
  - *Relieve congestion in the brood chamber when frames are covered with bees.*
    - Add honey supers early
    - Let the brood expand, and observe honey storage starting

      Add extra brood box and expand the brood chamber

      Add more honey boxes and remove/ replace honey boxes as needed

Damn It! I am more confused than before

- Progress Your hives in this way
  - *This is the visual representation of what was described in the previous slide.*
  - *Or you can simply perform a split to relieve congestion.*



THE SWARM THRESHOLD

Knowing when you are really in trouble, dealing with aftermath

Daughter Timelines – Swarm Emergence

- **Day 8 through 16 is the sweet spot**

  Origin Queen leaves prior to daughter emergence

  - *Day 1 – 20* | *Window – First drone to egg laid in cup*
  - *Day 1 [21]* | *1st eggs laid in queen cups.* ← **You are now in trouble**
  - *Day 8* | *1st cells sealed.*
  - *Day 8+* | *Swarm issues (prime swarm).* ← **Swarms Happen Here**
  - *Day 16* | *1st virgin queen emerges.*
  - *Day 16+* | *Virgin queens destroy sealed cells and fight each other until only one is left.*

It has started, what should I do?

- Day 8 through 16 presents the best opportunity for the impending swarm to leave.
  - ***Before they get away****, perform an artificial swarm (AKA Split) or some other intervention.*
  - *It is NOT advisable to mash all of the queen cells.*
    - First thing to consider is are you sure that the queen hasn't left and now you've made your hive queenless
    - Second thing to consider is that it is likely that the colony will still issue the swarm – regardless of if you smashed the queen swarm cells.

Are you too late? Yes of Course

Are you too late? Yup, highly likely

Are you to late? Yes, very much so

Colony health – *if the swarm got away*

- **Ensure colony rebounds**
  - *Inspect about one week after the swarm, see if queen is operational – but don't panic if not. Wait another week and check again for eggs.*
  - *Knowing if the hive is in trouble*
    - Without a queen you'll see:
      - No eggs and all cells have older larvae and/or capped brood
      - Less bees
      - Load of honey and/or pollen
    - Requeen to get it restarted.

Consider Swarm Traps

- **Make and place them near your apiary**
  - *Catching your swarm is a like a free package of bees*
  - *Better to have traps and making an attempt to catch any that get away.*
    - Keeps you from having bad encounters with your neighborhood.

Dynamic of After Swarms

- **If the hive is still crowded after the swarm has left.**
  - *Once the first queen emerges, this virgin will be chased away from the other capped queen cells*
  - *Workers will not permit the release the other virgin queens, but will feed them through the broken caps*
    - My expand on this: It could be noted that workers sometimes aid in queen release by helping her emerge. They do that through chewing the end caps some so the queen can have an easier time getting out from the inside of the capped queen cell. Even if she breaks through, they can still keep her from emerging.
  - *Piping: Toots and Quacks*
    - Piping of other corralled virgin queens may encourage the 1st emerged virgin queen to leave with some of the bees in the form of an After Swarm(s)
- **If the hive is no longer crowded things settle down.**
  - *The next released virgin queen or queens will go around and kill the other virgins in their cells or if they encounter another virgin that was release, they will battle to the death.*

Questions ?

About this presentation

- **Provided by Kevin Inglin, host of the Beekeepers Corner Podcast.**
  - *Questions or comments can reach me at kevin@bkcorner.org*
  - *Please feel free to visit my website – www.bkcorner.org.*
    - The podcast is available just about anywhere you can think of to subscribe to a podcast. Simply search for the beekeepers corner.
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Please note

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I will share that sometimes I encounter large chunks of my work and sometimes whole presentations passed off by others as their own. I see this also of other great presenters who are teaching beekeeping and it is disheartening. It is especially egregious when work is plagiarized and sold as training, sometimes word for word by unscrupulous individuals.

I appreciate that others would like to have the source files for the artwork. I have been asked many times where they came from and if they are available when posted to the internet in presentations I have shared.

Sorry, I simply do not want to handle requests for artwork exchange, nor do I wish to post the source images online or share PowerPoint decks.