



The Managed Mentoring Program on getting started in beekeeping.

# Managed Mentoring



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## Primer on Small Hive Beetles

Lesson | Small Hive Beetles



# What is Covered in this Module

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Small Hive Beetle Primer

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Small Hive Beetle Management Considerations

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Impacts of the Small Hive Beetle

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SHB Controls

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# Presence of Small Hive Beetles (SHB)

## □ Mid-Atlantic Assessment

- *The presence of Small hive beetles are quite common in beehives of the Mid-Atlantic Region*
- *Their impact to beehives spans from no impact to catastrophic*
- *Small hive beetle infestations can overwhelm a hive to the point of collapse*



# The Potential for Damage

- Small hive beetle can be a destructive pest of honeybee colonies in the following ways:
  - *Cause damage to comb; major infestations 'slime' the honeycomb*
  - *Consume larva, honey and pollen stores in the hive*
  - *Tainting stored and harvested honey.*
    - Honey is tainted by specific yeasts associated with the beetles and can be rendered foul and unfit for human consumption
  - *Colony absconding due to overwhelming infestation*



# Hive Beetle Forms Adult/Larva

## □ Adult appearance

- *The adult beetle is dark brown to black and about just under a 1/4-inch (5–6 mm) in length*



## □ Hive Beetle Larva

- *Three pairs of pro-legs near the head and spines on their back.*
- *7/16<sup>th</sup>-inch (11 mm)*
- *White or cream colored.*



# Hive Beetles in the Hive

## □ Larva & Adults

### ● *Larva*

- Small hive beetle adults are usually sequestered to the outer margins of the hive interior.
  - As such, this is the most common areas that eggs are laid, and larva are present
- Larva burrow through comb, consuming food stores for growth.
  - They will burrow into honey, pollen, and even brood frames. As scavengers they will consume honey, pollen, and developing larva.

### ● *Adults*

- They are found all throughout the interior, and traversing the margins



# Pupation

## □ Developed Larva will head for soil

- *Larva will feed within the colony for 2 to 4 weeks*
- *When it is ready to transform, it will leave the hive and burrow into the soil to pupate*
  - Larva can traverse vast distances to find suitable soil
  - Larva burrow into the soil, then develop an earthen cell where they pupate to an adult
    - The gestation of the SHB is very dependent upon conditions (soil moisture, temperature, composition, etc.). Good soil (for the beetles) means higher impact to some locations.
    - The developing beetle larva typically emerge in four to six weeks.





# Generally, a Minor Pest

- **Hive Beetles are mostly a 'minor pest'**
  - *Holistically it is not a routine for beekeepers to be concerned*
    - This is a generalization, and of no consolation to beekeepers who have lost a hive to the onslaught of hive beetles
  - *Certain regions have significant problems*
    - Some areas of the United States, including pockets of the Mid-Atlantic Region, are in a constant battle against hive beetles
    - Some geographies contribute to where hive beetles thrive
      - The support foods that keep beetles going (beyond beehives) and they have favorable conditions for reproduction (for example sandy soils that improve reproduction cycles)



# Hive Beetle Defense

## □ Honeybee Defenses

- *Strong colonies go a long way into keeping hive beetles at bay*
  - The best defense is maintaining strong colonies.
    - Strong colonies keep hive beetles out, and they keep them contained within the interior
      - It is however no guarantee from a hive being overrun. Sometimes even strong hives are overtaken
- *Hive Beetles Corralled*
  - Honeybees will mount an active defense to keep hive beetles confined within the hive.
    - Bees will surround a clutch of hive beetles and prevent them through active engagement from navigation into or around the hive



# Hive Beetle Trickery

- **Free Range Beetles live within the colony**
  - *Beetles that are not actively sequestered often can be found freely moving about on the comb*
    - Honeybees and Hive Beetles have evolved in tandem in the sub-Saharan Africa and co exist there.
    - They have proven troublesome for European Style bees of the US after being introduced here accidentally in 1996
  - *They employ a tactic for trophallaxes and are actually fed by bees*
    - Free walking hive beetles can trick honeybees into feeding them by mimicking the signal to interact with the mouthparts of the nurse bees



# Hive Beetle Slime

- **Yeast Spores in Beetles Feces are the culprit**
  - *As hive beetles consume resources in the hive they, like any other organism, defecate after consumption*
    - Their excrement contains spores of yeasts that thrive in the moist environment of the comb – and it is the yeast that consumes the resources and transforms honey into a slimy residue
    - A bloom from the yeast happens rapidly and an infestation can overwhelm a hive in 24 to 36 hours if left unchecked
    - The impacted honey will leak from the cells and drip down the hive, even running out of the entrance in some instances.



# Pest Management Approaches

## □ Traps and Biological Controls

### ● *Beetle Traps*

- Takes advantage of hive beetles trying to avoid guard bees.
- They will seek refuge in quieter, dark places, and are tempted to hide specially designed traps.
  - Many traps are filled with oil, and the beetles die after being submerged

### ● *Biological - Mechanical Controls*

- There are a handful of biological and mechanical controls that one can use to combat hive beetles – *Expanded upon in the next few slides...*



# Biological – Soil Controls

## □ Soil Treatments

- *If you can control the soil around the hive and damage the larva...*
  - Some employ diatomaceous earth (cuts through the outer surface with its sharp shard shapes), some put hard covers around the hives
    - Hive beetles typically crawl around three feet and then burrow into the ground. They can by observation crawl far distances to find a suitable place to enter the soil
      - Areas with hard frosts often kill off populations of hive beetles and lessen impact in the spring.
      - Hive beetles are strong fliers (can fly up to 6 miles in one go) so they will come north during spring, even if they die off in the soil
  - Some place salt on the soil
- *Use care not to impact bees while employing approaches*



# Mechanical Controls - Barriers

## □ Ingenious Barriers to Entry

- *Other approaches include specialized barriers built into hive equipment*
  - Some beekeepers look to employ specially designed barriers that use the biology and behavior of the mite to sequester them so they cannot make entry
    - One example is a specialized trim affixed to bottom boards that hangs over the edges of the bottom board where it mates up with the hive boxes.
      - This trim prevents the beetles from going up and over into the hive.
      - Bees catch the beetles trying to get around the obstruction and corral them; preventing access into the hive.
  - Variations on these approaches are on the web; found with a little research



# Mechanical Controls – Swiffer Style Sheets

## □ Swiffer Sheets

- *Small sheets cut out and place in and around the hive interior*
  - Like Velcro to small hive beetle legs, placing small swaths of sheets have proven effective at trapping hive beetles
  - One places the swaths in the corner margins
    - Hive beetles seek refuge from guard bees on the interior
      - As such they are often found in dark corners, hiding on the inner cover, and in the margins of the bottom board. You will also find a contingent of bees constraining their movement (hive beetles jail)
    - Sheets place in this location catch up the hive beetles, but not the bees
      - Occasionally though bees do sometimes get entangled in the fabric





# Biological Controls

## □ Beneficial Nematodes

- *Specific forms of nematodes can be purchased and distributed on the soil around the hive*
  - Nematodes are not detrimental to honey bees
  - Two specific species for hive beetles: invective nematodes (Steinernematidae & Heterorhabditidae genera).
  - They will seek out larva in the soil and damage them when they burrow into them and lay their eggs
- *This is a consideration when trying to cover a wide swath of soil*



# Chemical Control

- **Noted, but Never recommended by us**
  - *There is one approved chemical beekeeping treatment that kills hive beetles (Checkmite+) but should never be used in this manner*
    - The active ingredient is Cumophos, a proven harmful Organophosphate
    - We feel tis product is truly a no-go when it comes to placement into beehives and strongly advise against its use
      - While it is still sold in catalogs, Cumophos contaminates the comb and takes forever to dissipate in the environment. Do not do this.



# Closing Comments

- **Customary Close**
  - Where we stand, where we are going...
    - *This lesson was a primer on Small Hive Beetles in our region*
      - If you are in different parts of the US, you may want to seek additional guidance.
    - *Our next run of lessons focus on keeping healthy bees*
      - The calendar of Summer
      - From two boxes to three or more
      - Summer and Fall Management
      - Mentor Visits where applicable



# Q&A

- **What Questions did we not anticipate?**
  - If you have feedback, you can leave a constructive comment; but be nice.
  - You could also send an email to [comments@managedmentoring.com](mailto:comments@managedmentoring.com)
    - *Please refer to this video in the subject so we know what the reference is.*

