Varroa Mite IPM Series
Part 1: Varroa mite biology and life history
Webinar Details

Welcome

A recording of this webinar will be available within a week at

http://www.neipmc.org/go/ipmtoolbox
We Welcome Your Questions

Please submit a question at any time using the Q&A feature to your right at any time.

If you’d like to ask a question anonymously, please indicate that at the beginning of your query.
Webinar Presenters

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Some Questions for You
Outline

Honey Bee Health
  Maine
  Massachusetts

Varroa Mites
  Biology
  Viruses
  Seasonal growth
  Death diagnosis

Future Webinars
HONEY BEE HEALTH
Varroa Mite IPM: Part 1
Varroa mite biology and life history

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ME Losses 2018/2019

2018/2019 Loss: 45.2%
    Summer: 6.2%
    Winter: 39.0%

2017/2018 Loss: 43.4%
    Summer: 7.0%
    Winter: 36.4%

2016/2017 Loss: 45.0%
    Summer: 5.9%
    Winter: 39.1%
### ME Losses 2018/2019: 45.2%

<table>
<thead>
<tr>
<th>Summer (6.2%)</th>
<th>Winter (39%)</th>
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<tbody>
<tr>
<td>Queen loss/failure (11.9%)</td>
<td>Varroa mites/viruses (26.7%)</td>
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<tr>
<td>Varroa mites/viruses (8.6%)</td>
<td>Unknown (19.4%)</td>
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<tr>
<td>Unknown (7.2%)</td>
<td>Environmental factors (18.3%)</td>
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<td>Environmental factors (4.2%)</td>
<td>Queen loss/failure (13.1%)</td>
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68.9% no summer loss

31.9% no winter loss
673 beekeepers; 13 counties; 3,186 colonies

Annual Reported Colony Losses = **33%**

- Losses attributed to:
  - Varroa mites (**30%**), Viruses (**6%**), CCD (**6%**), Nosema (**2%**)
  - Starvation (**19%**), Queen issues (**18%**)
  - Environmental factors (**21%**), Natural disaster (**5%**), Pesticides (**6%**)

Beekeepers reported the single greatest threat affecting MA honey bees are **Varroa mites (54%)**, **Pesticides (17%)** and **Environmental factors (9%)**
Maine
- Winter Loss: 35.2% (#19 in US)
- Summer Loss: 9.71% (#44 in US)
- 3rd highest in Northeast
- 23-87% reported losses since 2010/11

Massachusetts
- Winter Loss: 25.6% (#36 in US)
- Summer Loss: 13.3% (#32 in US)
- Highest in New England
- 16-65% reported losses since 2010/11
Inspector reported causes of death

25% queen loss, starvation, poor winter moisture, cold snaps, etc.
70% varroa mites and viruses
5% everything else
  foulbrood, nosema, vertebrates, insect pests, etc.
2019 Dead-Out Hive Evaluation
(N=74 hives)

Varroa count (per 300 bees)

Barnstable, Berkshire, Bristol, Dukes, Essex, Franklin, Hampden, Hampshire, Middlesex, Norfolk, Plymouth, Worcester
Questions
VARROA MITE BIOLOGY
Varroa Mites

- **Varroa destructor**
- Discovered in the United States in 1987, from SE Asia
- Small, red to brown, triangular
- Feed off the body fluids of adult, pupal and larval bees
- One of the largest ectoparasite to host relationship

***Number 1 cause of fall/winter deaths in the Northeast***
Varroa Mite – Dispersal Phase

- Female mites pass from bee to bee as they walk past one another
- Move to un-infested colonies by drift
- Mites feed between the abdominal segments
- Puncture exoskeleton and feed on bee fat bodies
- Mites occasionally found on thorax or top of bee – looking for new host
- If there is no brood can live feeding on adult bees for five to six months
Varroa Mites - Reproductive Phase

- Female mite leaves the adult bee
- Enters an about to be capped cell
- Mite submerge itself in the brood food, cell is capped
- First egg is unfertilized, develops into a male mite
- Subsequent eggs are fertilized, develop into females
- Adult mite offspring mate with their siblings

- The average foundress mite produces
  - 1-2 offspring per worker cell
  - 2-3 offspring per drone cell (8-10X more infested)

- 50-90% of Varroa is in capped brood cells
- On average mite populations double every month
Varroa Parasitism Effects

- Shortens worker lifespan
- Impairs foraging ability - flight behavior, orientation
- Increases worker drift & robbing
- Increases queen supersedure
- Reduces sperm production in drones
- Reduces colony-level honey production
- Reduces colony-level winter survival
- Increases likelihood of virus transmission
VARROA MITE VIRUSES
Viruses

• 20+ viruses of honey bees have been identified
• Spread venereally, horizontally, and vertically
• Mostly persist naturally in colonies at low levels with no symptoms
• Most symptoms are generic
• Many have varroa mites associations
Viruses

• No treatments for viruses
• Maintain healthy/strong colonies
• Control varroa mites
Deformed Wing Virus

- Found worldwide, early 90s
- Several co-variants
- Worse with varroa

Symptoms
- Twisted and wrinkled wings
- Crawling on the ground in front of the hive
- Small and discolored abdomens
- Die in 3 days
Generic Adult Viral Symptoms

- Trembling
- Paralysis
- Darkened bodies
- Greasy looking
- Hairless
- Small size
- Decreased longevity
Varroa Mites

• CONSIDERED ONE OF THE BIGGEST PROBLEMS FACING HONEY BEES!!

• Can carry and spread viruses

• If left unchecked varroa mite will kill your hives

• Most problematic
  – when bee numbers are reduced in preparation for winter
  – poor or late spring/summer forage
VARROA MITE SEASONAL GROWTH
Figure 1. Simplified bee and mite population growth curves for a temperate climate. The mite growth curve lags behind the bee curve. Note how the number of mites per hundred bees greatly increases in fall. A colony is unlikely to survive a fall infestation rate this high.
VARROA MITE DEATH/DIAGNOSIS
How do I know if my hive died from Varroa?
What time of year is it and when was the last time you saw the hive alive?

Summer: queen, brood, or food issues
Fall: varroa and their viral complex
Winter: varroa mites/viruses, bad winter, or starvation

***When was the last time you saw the hive active***
Plenty of honey in the hive

Inadequate stores could mean starvation
No signs of queen issues

Signs of queen issues
no queen in dead bees
no eggs or brood
lots of drones
many emergency queen
cups or cells
Fall/early winter: Only a handful of bees, brood and the queen remaining in what was once a strong hive.

Virus makes the adult bees feel sick

If the weather is warm they leave and die somewhere else

Cluster size decreases until it is too small to stay warm
Mite Bombs

Late fall/early winter deaths can become “mite bombs”

Can look like absconding
Late winter death: Lots of dead bees on the bottom board, small dead cluster on face of frame

Bees die over time until cluster is too small to keep warm

Look for mites on dead cluster or on bottom board
The dead adult bees are abnormal

Deformities:
- short abdomens
- stubby wings
- hairless
- greasy
- black

Signs of viruses

Many viruses are associated with high varroa mite levels
There are white crystals stuck to the cell walls of empty comb.
Normal crystallization and fermentation
Remaining brood looks “sick”

A spotty brood pattern common in failing hives

Could be due to a brood disease
check for symptoms of AFB, EFB, etc.

“Normal” dead brood
gray/white in color
no roping
no bad smell (fish, rotting meat, etc.)
Healthy Brood

- Uniform appearance
- Few interruptions in pattern
- Pearly white
- Cappings convex, not perforated or greasy
- No offensive odor

**When these criteria are not met, needs further inspection and evaluation**
There are varroa on brood/bees removed from cells

Remove dead brood and bees using a toothpick or forceps
WHERE TO GO FOR MORE INFORMATION
Apiary Inspectors

We love talking about bees!
A Guide for Beekeepers

Every beekeeper should seek to have hives that are healthy and productive. Today, the many threats to bee health — including parasites, pests, disease, pesticides, and inadequate nutrition — make achieving this goal a major challenge. Successful beekeeping means closely monitoring bee health and taking proactive steps to protect them.
Bee Informed Partnership

- Loss and Management Survey
- APHIS National Honey Bee Disease Survey:
  - Varroa, Nosema, Virus, Pesticides
- Hive Monitors
  - Weight, temperature, and humidity
- Sentinel Apiary
  - Varroa and Nosema
- MiteCheck
  - Self-reported mite levels
Local/state/national honey bee organizations

Go to meetings!!

- National and state meeting
  - Learn about the new research
  - Meet other types of beekeepers
- Local meeting are good places to
  - find out how to keep bees in the area
  - 100s of years of experience in the room

Get a mentor/ work with other beekeepers

- Get a chance to look in many different hives
- Pest management is often a community effort
EAS MAINE 2020
The Art & Science of Beekeeping
August 3rd-7th Orono, Maine
Fight The Mite Workshop for Beekeepers

Saturday May 2nd 2020 9am-4pm
University of Massachusetts
Fernald Hall, Amherst, MA

COST: $40
https://ag.umass.edu/pollinators/events/fight-mite

Registration Includes:
• Bee-themed T-Shirt
• Sampling jar
• IPM brochure
Chance to win Apiary Diagnostic Kit!
Questions
Join us for the next webinars!!

Monday, March 23, 1:00–2:30 p.m. — Mite monitoring and treatment
Monday, April 6, 1:00–2:30 p.m. — Creating a varroa mite IPM plan
Monday, April 20, 1:00–2:30 p.m. — Demonstration and Q&A
Some Questions for You
Find a Colleague

To post a profile about yourself and your work:

http://neipmc.org/go/APra

“Find a Colleague” site

http://neipmc.org/go/colleagues
Archive of Today’s Webinar

Today’s Webinar will be available to view on demand in a few business days.

http://www.neipmc.org/go/ipmtoolbox

You can watch as often as you like.
This presentation was funded in part by the Northeastern IPM Center through Grant #2014-70006-22484 from the National Institute of Food and Agriculture, Crop Protection and Pest Management, Regional Coordination Program.
Thanks for Joining Us!

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