Varroa Mite IPM Series
Part 2: IPM Varroa Mite Sampling
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

Kim Skyrm, Ph.D.,
Chief Inspector
MDAR Apiary Program
617-626-1801
bees@mass.gov

Jennifer Lund
MDACF Apiary Program
207-287-7562
Jennifer.lund@maine.gov
Some Questions for You
Outline

- Varroa Mites
- Varroa Mites Integrated Pest Management (IPM)
- Monitoring and Inspection
- Varroa Mite Sampling Method
- Next Steps after Sampling
- Future Webinars
Varroa Mites

• *Varroa destructor*
• Small, red to brown, triangular
• Feed on adult, pupal and larval bees
• One of the largest ectoparasite to host relationship

***Number 1 cause of fall/winter deaths in the Northeast***
Dispersal Phase:
• Female mites pass from bee to bee
• Move to un-infested colonies by drift
• Mites feed between the abdominal segments
• Puncture exoskeleton and feed on bee fat bodies

Reproductive Phase:
• Female enters an about to be capped cell
• First egg unfertilized, next eggs are fertilized
• 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
Questions
VARROA MITE INTEGRATED PEST MANAGEMENT (IPM)
Integrated Pest Management (IPM)

Decision making process that uses a combination of techniques to suppress pests:

– Plan and manage to prevent organisms from becoming pests
– Identify and understand potential pest problems
– Monitor pest populations
– Use injury thresholds to make treatment decisions
– Reduce pest populations using strategies that may include a combination of biological, physical, cultural, mechanical, behavioral, and chemical controls
– Evaluate the effectiveness of treatment
Integrated Pest Management (IPM)

• The goal of IPM is not to eradicate a pest but to hold potentially harmful species at tolerable levels.

• IPM utilizes biological, physical, and chemical controls as well as habitat modification techniques.
What Is Varroa Mite IPM?

Pyramid of IPM Practices

- Synthetic chemicals
- Natural chemicals
- Cultural
- Monitoring
- Genetic

Resources for Integrated Pest Management (IPM) and Varroa Mite Control
Principles of Varroa Mite Integrated Pest Management (IPM)

1. **Bee Knowledgeable!** Know bee & mite (pest) biology

2. **Bee-a-Keeper!** Monitor hives frequently to determine mite levels & compare with established threshold

3. **Bee Active!** Use an “integrated” management approach consisting of prevention (non-chemical/cultural) then intervention (chemical) tools

1. **Bee Prepared!** Establish an IPM Plan for your Apiary before the season starts
Monitored for Varroa Mites

- 2016/17: N=100 beekeepers
- 2017/18: N=49 beekeepers
- 2018/19: N=673 beekeepers
Questions
VARROA MITE MONITORING AND INSPECTION
Maine Varroa Mite Monitoring

2018/19: 65.6% monitor for Varroa
2017/18: 64.2%
2016/17: 50.6%

More than a third (34%) not monitoring!!!
<table>
<thead>
<tr>
<th>YEAR/SAMPLE SIZE</th>
<th>Overall</th>
<th>No Varroa Monitoring</th>
<th>Varroa Monitoring</th>
<th>Alcohol Wash</th>
<th>Other Monitoring Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>2016/2017</td>
<td>172</td>
<td>45.0</td>
<td>77</td>
<td>45.8</td>
<td>95</td>
</tr>
<tr>
<td>2017/2018</td>
<td>212</td>
<td>43.4</td>
<td>74</td>
<td>59.9</td>
<td>136</td>
</tr>
<tr>
<td>2018/2019</td>
<td>360</td>
<td>45.2</td>
<td>119</td>
<td>47.1</td>
<td>236</td>
</tr>
</tbody>
</table>

Average Winter Loss per Beekeeper
Monitored For Varroa

Monitored for varroa: 39.5%
Did not monitor for varroa: 51.7%

N=285 responses
Varroa mites - Inspection

An accurate sampling device is needed to determine when a treatment is needed.

Visual inspections on adult and immature bees gives an index.
How Many Mites Do You See?

4 mites total!
13 mites total!
Varroa Mite Monitoring

Methods

- **Alcohol Wash**
  - 2016/17: 30
  - 2017/18: 40
  - 2018/19: 50

- **Sugar Shake**
  - 2016/17: 20
  - 2017/18: 30
  - 2018/19: 10

- **Bottom Board**
  - 2016/17: 40
  - 2017/18: 30
  - 2018/19: 20
## 2018/2019 Varroa Mite Monitoring

<table>
<thead>
<tr>
<th>Method</th>
<th>2017/2018</th>
<th>2016/2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor for Varroa</td>
<td>64.2%</td>
<td>50.6%</td>
</tr>
<tr>
<td>Sticky board</td>
<td>33.0%</td>
<td>31%</td>
</tr>
<tr>
<td>Sugar roll</td>
<td>26.4%</td>
<td>23%</td>
</tr>
<tr>
<td>Alcohol roll</td>
<td>19.3%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Average Winter Loss per Beekeeper
Varroa Monitoring Techniques

**ALCOHOL WASH**

- Used selected techniques: 33.8%
- Did not use selected techniques: 45.0%

**POWDERED SUGAR SHAKE/ROLL**

- Used selected techniques: 41.4%
- Did not use selected techniques: 40.2%
Why Alcohol Wash?

- **Cost:** cheap
- **Materials:** easy to obtain, easy to use, easy to store, durable, fast cleanup, sanitizing process
- **Reliability:** results can be re-checked to confirm count, samples can be re-analyzed/stored for future evaluation

**Other Methods Not as Good!**

a. **Powdered sugar:** kills bees too, affected by humidity
b. **Sticky board:** great for “quick check”, hard to estimate infestation level
c. **Drone brood uncapping:** not always present, hard to estimate infestation level
d. **Visual inspection:** hard to see/may not have visible mites on bees
What’s Your Varroa Mite Count?
Find Out With a FREE Alcohol Wash Kit!

MDAR
Division of Crop and Pest Services
Meet The Varroa Mite...

The Varroa Mite, *Varroa destructor*, is an external parasite that attacks adult and immature stages (brood) of honey bees. These mites weaken bees and can transmit viruses during the feeding process.

Common signs of mite damage include:
1) open or damaged pupal cells;
2) holes in pupal cappings;
3) emerging adult bees with deformed or missing wings; and
4) visible mites on bees/brood.

Unmonitored and untreated infestations of Varroa mites can result in colony death. Colonies should be routinely monitored so informed management decisions can be made about population levels, treatment methods and efficacy. To obtain the best results, incorporate a range of the chemical and cultural Integrated Pest Management (IPM) methods listed in this brochure.

10 Steps To Doing An Alcohol Mite Wash

**MATERIALS NEEDED:**
- dishpan
- ½ cup measuring device
- ½ cup 70% rubbing alcohol
- mite wash jar

**DIRECTIONS:**
1. Inspect honey bee colony to remove a single frame that contains open brood and adult bees. Make sure the queen is not on the frame.
2. Shake worker bees from this frame into the dishpan.
3. Quickly scoop ½ cup of worker bees (~300 bees) from the dishpan and put into provided mite wash jar filled half-way with 70% alcohol.
4. Shake leftover live bees from the dishpan back into the hive.
5. Put the solid and mesh lids on jar and tightly seal.
6. Shake jar vigorously for 1-2 minutes to dislodge mites from submerged bees. Let jar sit for a few minutes to let mites dislodge.
7. Remove solid lid from jar, leaving mesh lid and tightly seal.
8. Pour the mixture of dead bees, mites and alcohol through the mesh lid over the empty dishpan to remove the mites and alcohol. Vigorously shake jar contents while pouring to ensure mites are dislodged.
9. Sift through the liquid debris to count the total mites. If the total number of mites ranges from 3-9, consider treatment options.
10. Discard bees. Alcohol can be re-used if mites are removed. Wash all re-usable materials after use.
Questions
VARROA MITE SAMPLING METHOD
Varroa Mite Sampling Materials
52 mites total!
141 mites total!
What Was Your Count?

If between 3–9 then above threshold, perform treatment
Alcohol Wash Sampling Tips

❖ Always target nurse bees by selecting open brood frame for samples
❖ Check for queen on frame before taking sample!
❖ Repeat rinse/strain steps for greater accuracy
❖ Sample all colonies in apiary?
  ❖ < 10 colonies = all
  ❖ otherwise 3–5% of colonies
❖ Remember: Practice improves accuracy!
❖ Sample PRE & POST treatment or else what is the point of treating?!?!!
Varroa Mite Sampling Exercise
Questions
NEXT STEPS AFTER SAMPLING
Highest Mite Count Reported Per County

United States, counts are per 100 bees, 2019-09-07 to 2019-10-07

- 0 - 3: Relatively low mite level, keep monitoring and managing (splitting, drone trapping, brood breaks, screened bottom boards) mite populations.
- 4 - 5: Intervention (use of a miticide) will greatly increase chances of colony survival.
- 6 - 10: Colony loss or damage likely. Intervention is critical to prevent colony loss from mite infestation.
- 11+: Loss of colony likely. Intervention is essential to decrease the threat of horizontal transmission (spread) of mites to neighboring colonies.

https://research.beeinformed.org/mitecheck/
Nosema/Varroa Mite Sample Kits

Kit Includes:
- Pre-labeled envelope
- Wet sample secure bag
- Labeled outer plastic bag

Beekeeper Cost (per kit): ~$4.00/postage & alcohol
Fight The Mite Workshop for Beekeepers

Saturday May 2nd, 9am-4pm – UMass-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
FUTURE WEBINARS AND WORKSHOPS
Join Us for Future Webinars!

❖ Monday, April 6th, 1:00-3pm: Varroa Mite IPM: Management Tools

❖ Monday, April 20th, 1:00-2:30pm: Varroa Mite IPM: Creating Your Own IPM Plan
EAS MAINE 2020
The Art & Science of Beekeeping

August 3rd-7th Orono, Maine
Some Questions for You
Find a Colleague

✍ To post a profile about yourself and your work:
✍ [http://neipmc.org/go/APra](http://neipmc.org/go/APra)
✍ “Find a Colleague” site
✍ [http://neipmc.org/go/colleagues](http://neipmc.org/go/colleagues)
Recording of Varroa Mite IPM Webinar Series

- Past recordings and today’s Webinar will be available to view on demand in a few business days.

- [http://www.neipmc.org/go/ipmtoolbox](http://www.neipmc.org/go/ipmtoolbox)

- You can watch as often as you like.
Acknowledgements

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Thanks for Joining Us!

Jennifer Lund
MDACF Apiary Program
207-287-7562
jennifer.lund@maine.gov

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