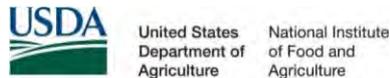
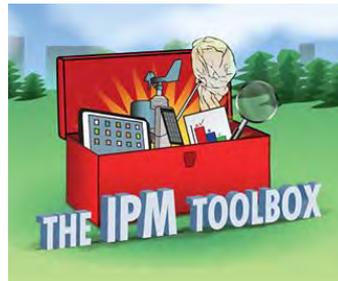




Varroa Mite IPM Series

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



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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



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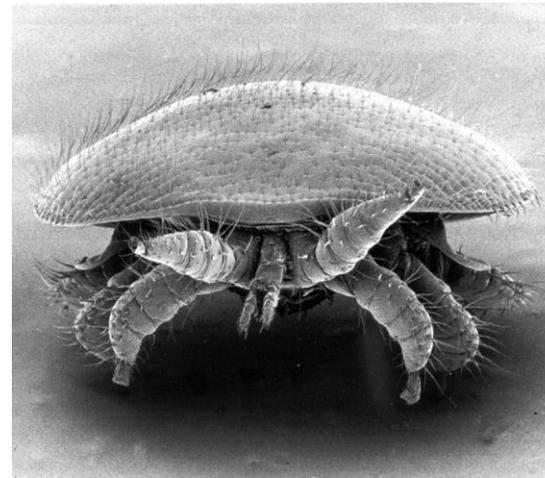
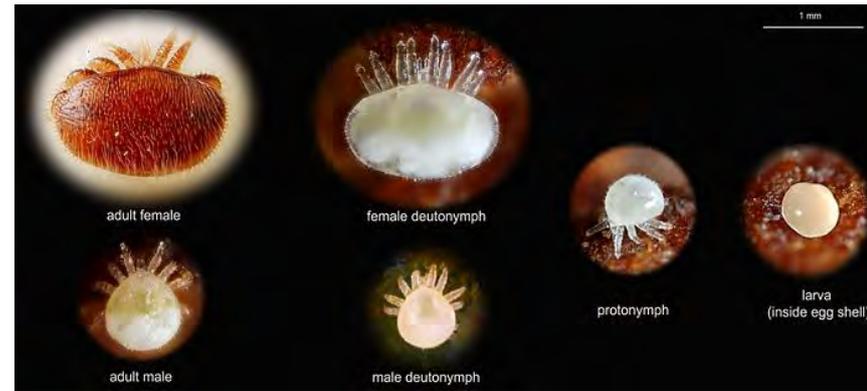
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Varroa Mites

Number 1 cause of fall/winter deaths in the Northeast

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







Research.msu.edu



Nzgeo.com

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



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VARROA MITE INTEGRATED PEST MANAGEMENT (IPM)



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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





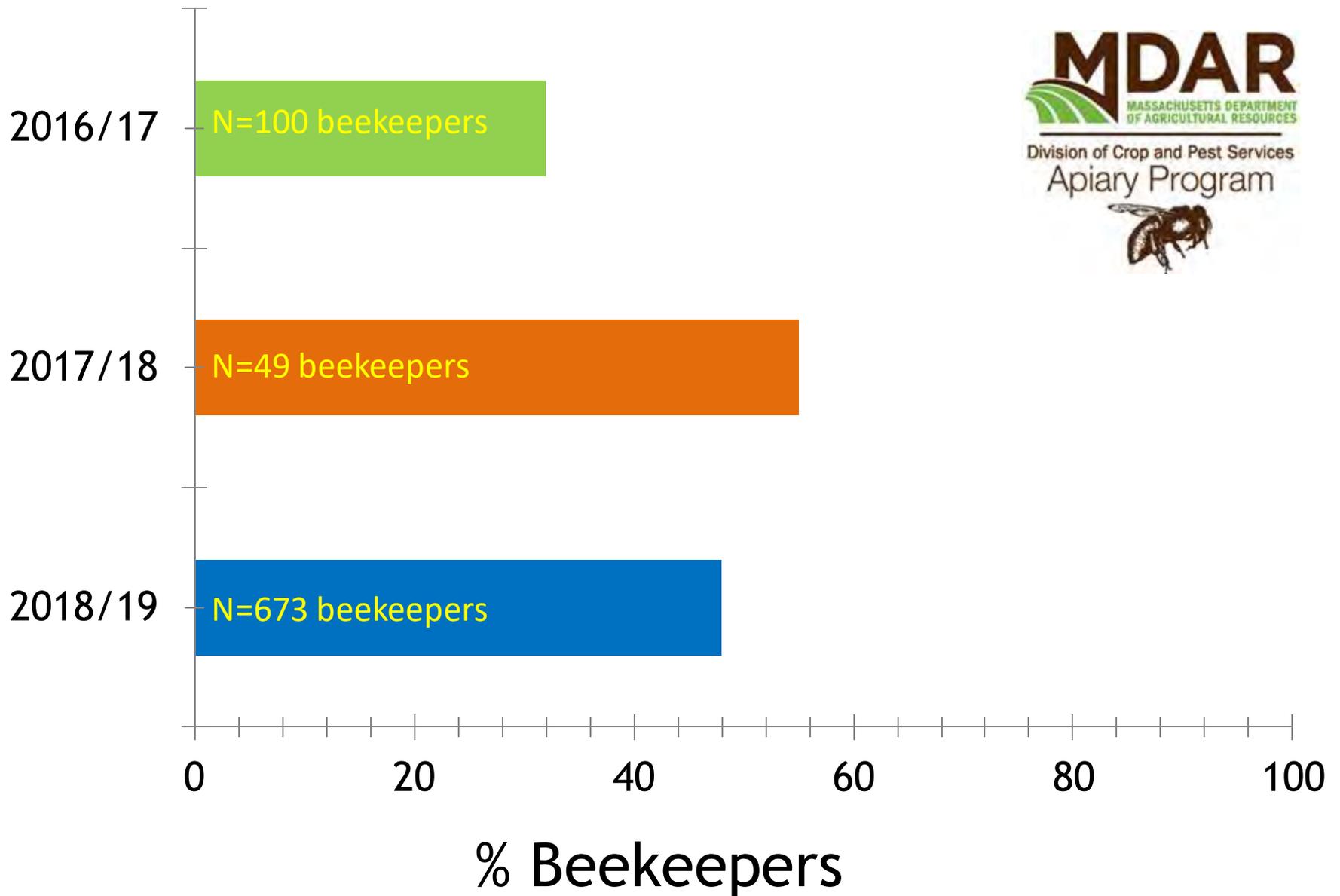
Principles of Varroa Mite



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



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VARROA MITE MONITORING AND INSPECTION



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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!!!



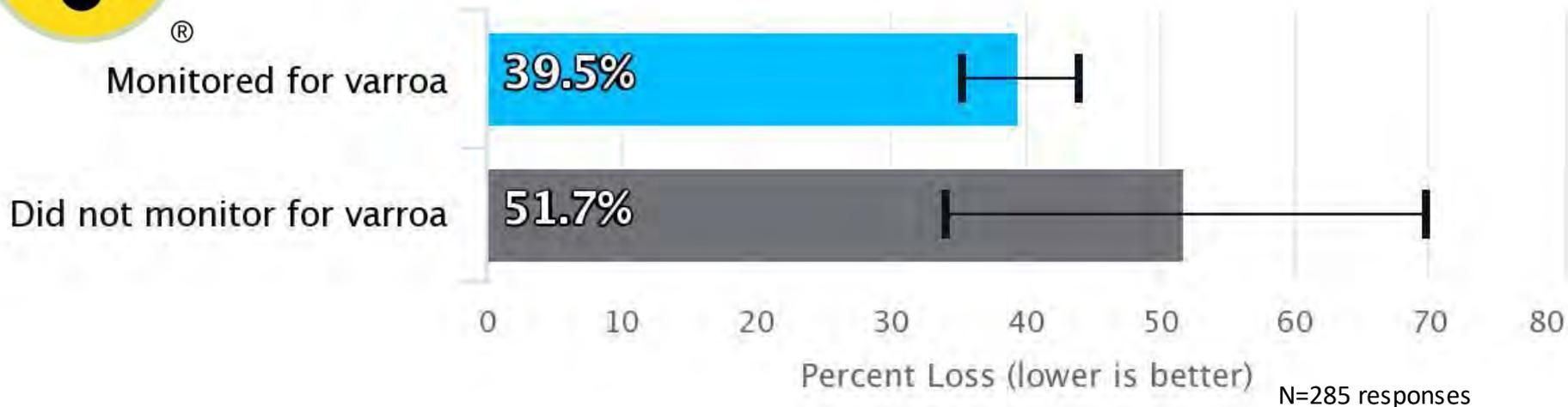


YEAR/ SAMPLE SIZE	Overall		No Varroa Monitoring		Varroa Monitoring		Alcohol Wash		Other Monitoring Method	
	n	%	n	%	n	%	n	%	n	%
2016/2017	172	45.0	77	45.8	95	44.6	19	39.0	76	49.7
2017/2018	212	43.4	74	59.9	136	38.8	40	28.0	96	47.5
2018/2019	360	45.2	119	47.1	236	44.6	112	38.0	124	51.0



Average Winter Loss per Beekeeper

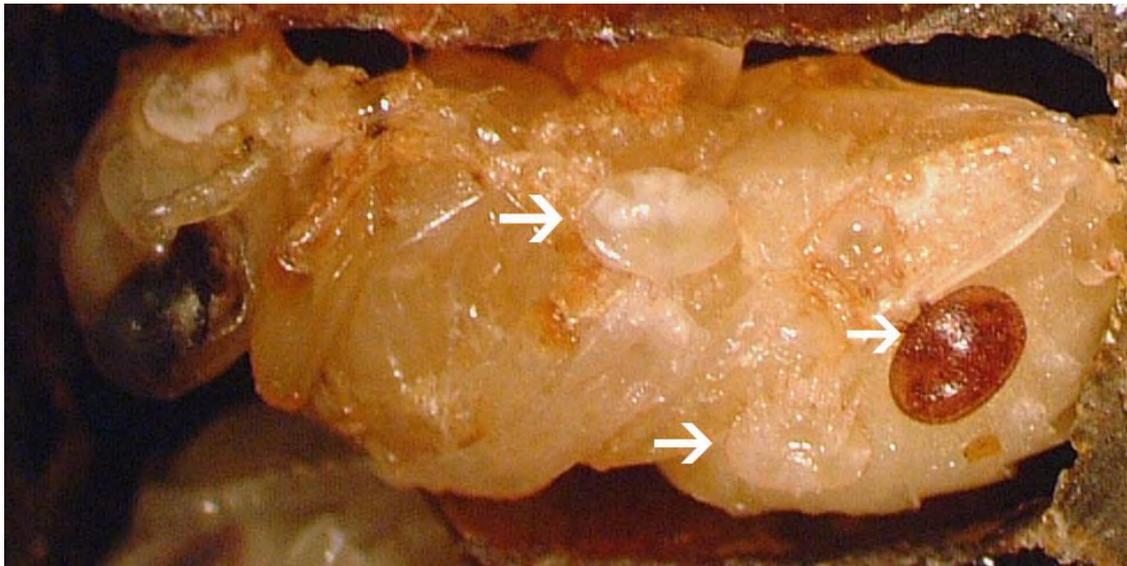
2018-2019 - New England-ish States: CT, MA, ME, NH, NY, RI, VT
Monitored For Varroa

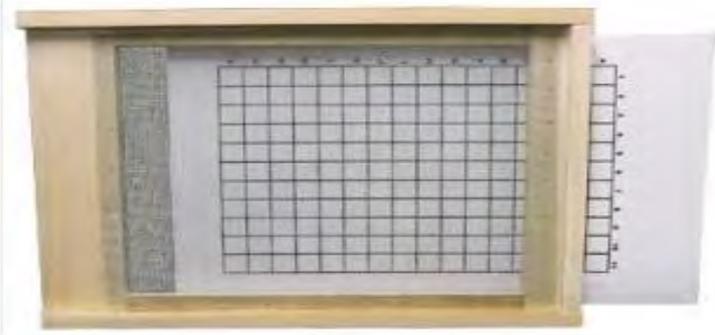


Varroa mites - Inspection

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!

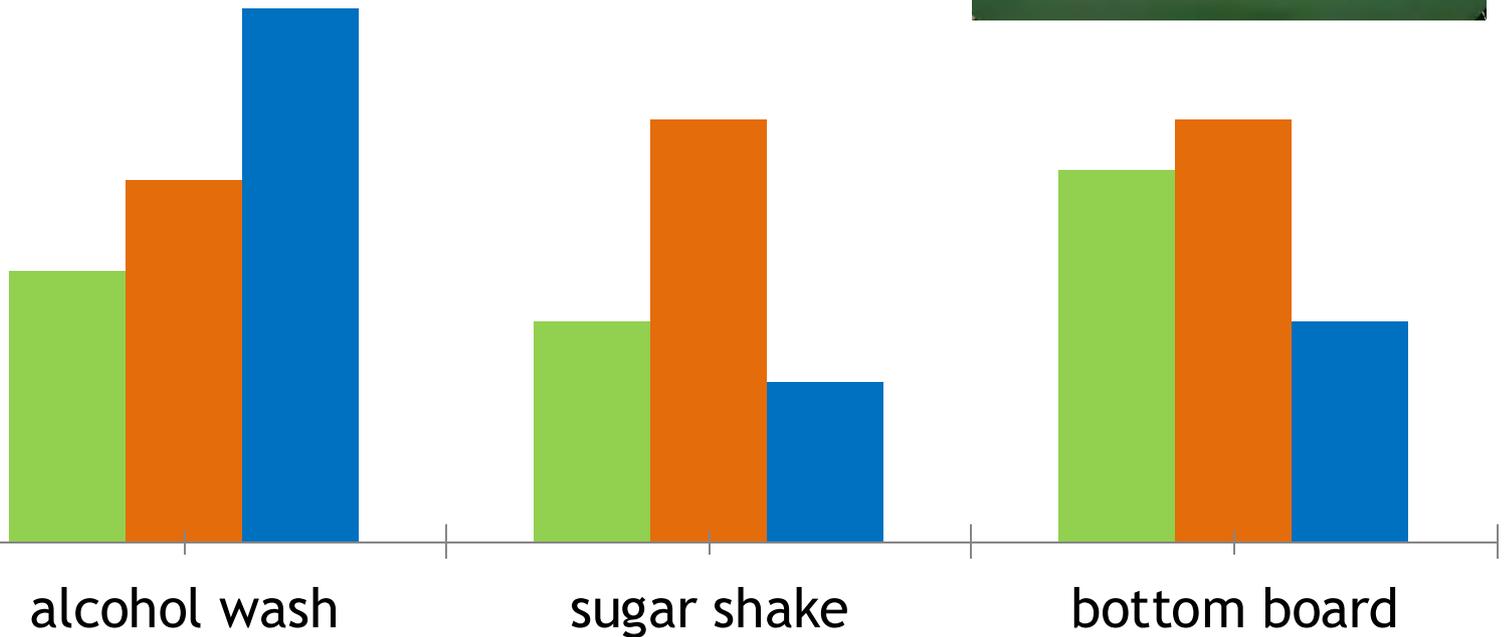
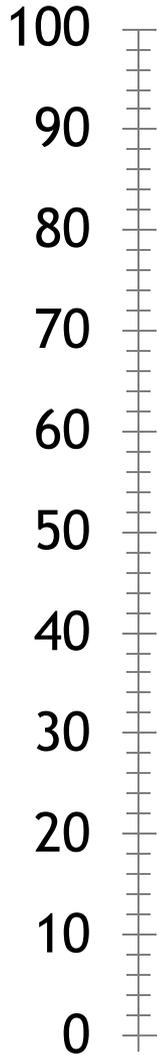


13 mites total!

various methods

Methods

- 2016/17
- 2017/18
- 2018/19



2018/2019 Varroa Mite Monitoring

65.6% monitor for Varroa

- 🐝 31.9% sticky board
- 🐝 18.8% sugar roll
- 🐝 31.1% alcohol roll

	2017/2018	2016/2017
	64.2%	50.6%
	33.0%	31%
	26.4%	23%
	19.3%	11%



Average Winter Loss per Beekeeper

2018-2019 - New England-ish States: CT, MA, ME, NH, NY, RI, VT

Varroa Monitoring Techniques



ALCOHOL WASH

Used selected techniques

33.8%

Did not use selected techniques

45.0%

0 10 20 30 40 50 60

Percent Loss (lower is better) N=184 responses

POWDERED SUGAR SHAKE/ROLL

Used selected techniques

41.4%

Did not use selected techniques

40.2%

0 10 20 30 40 50 60

Percent Loss (lower is better) N=237 responses

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!



Calling all beekeepers...
PROTECT FROM...
EVERY colony is built on the strength of its members. The colonies they choose...
DETECT, MONITOR, AND CONTROL...
Massachusetts IPM Center
USDA
MDAR
ME
Varroa Mite IPM

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.



Varroa Mite IPM



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VARROA MITE SAMPLING METHOD



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Varroa Mite Sampling Materials













5/16

5/16

5/16

5/17































Wash
... cup measuring device, 1/8
... ensures the queen is not on
... place into pint-sized jar
... back into colony.
... at upright for 10
... mesh lid strainer over
... to get all mites.
... information.
... use.



bees is not on
per colony
per night for 10
over
miles
from 3-9
[illegible]





...ing device, 1/8

... queen is not on

... pint-sized jar
... into colony.

... upright for 10

... lid warmer over
... to get all miles.

... pages from 3-9,
... information.







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





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NEXT STEPS AFTER SAMPLING



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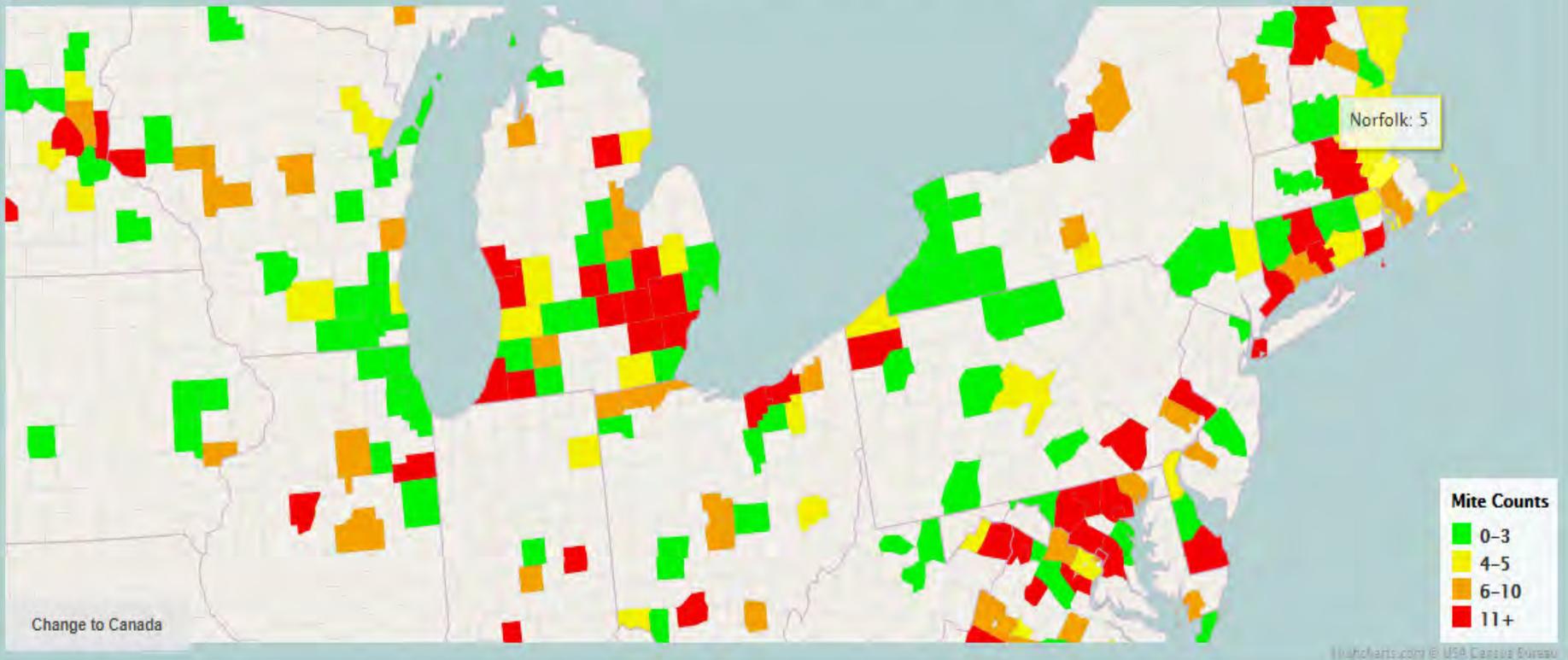


📅 Responses sampled from **August 1st, 2019** to **October 7th, 2019**

Change ▾

Highest Mite Count Reported Per County

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



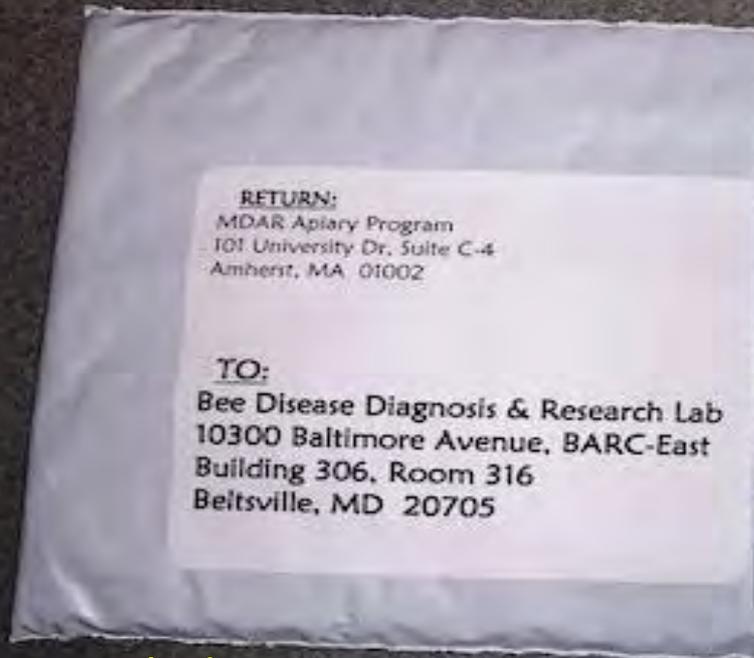
0 - 3: Relatively low mite level, keep monitoring and managing (splitting, drone trapping, brood breaks, screened bottom boards) mite populations.

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.

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>

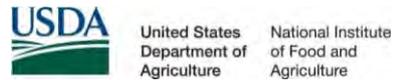
Registration Includes:

- Bee-themed T-Shirt
 - Sampling jar
 - IPM brochure

Chance to win Apiary Diagnostic Kit!



Questions





FUTURE WEBINARS AND WORKSHOPS



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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>

✿ “Find a Colleague” site

✿ <http://neipmc.org/go/colleagues>

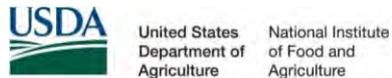
Recording of Varroa Mite IPM Webinar Series

- ✿ Past recordings and today's Webinar will be available to view **on demand** in a few business days.
- ✿ <http://www.neipmc.org/go/ipmtoolbox>
- ✿ You can watch as often as you like.

Acknowledgements

Northeastern IPM Center

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Thanks for Joining Us!



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