

Varroa destructor: biology, monitoring and control




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Varroa destructor Anderson & Trueman (Acari: Varroidae)

Adult female: 1.5 x 1.0 mm



ecto-parasitic mite of the honey bee, *Apis mellifera* L.



Vectoring viruses
e.g. DWV, IAPV

Inhibit bee's
Immune response

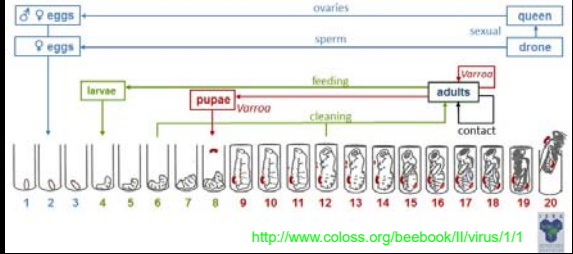
High mortality
of pupae

Affecting bee
physiology and
behavior

Severe impact on honey bee industry

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1. Varroa: reproductive stage



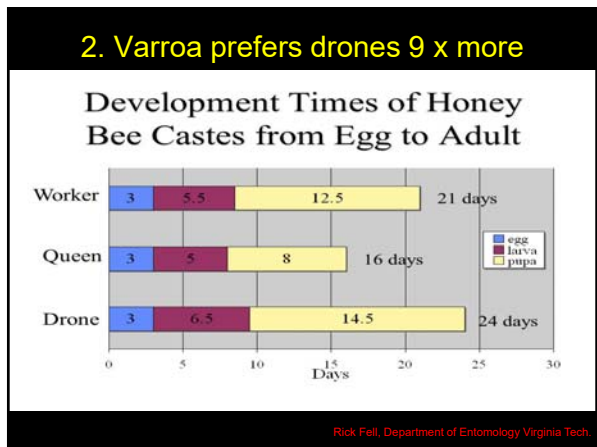
<http://www.coloss.org/beebook/II/virus/1/1>

60 hrs post capping: 1st ♂ egg
 1 ♀ egg every 20 hrs, ♀: 7-8 days to mature
 Brother-sister mating
 Immature ♀ and adult ♂ die after worker emerges
 Viruses can be transmitted to pupae

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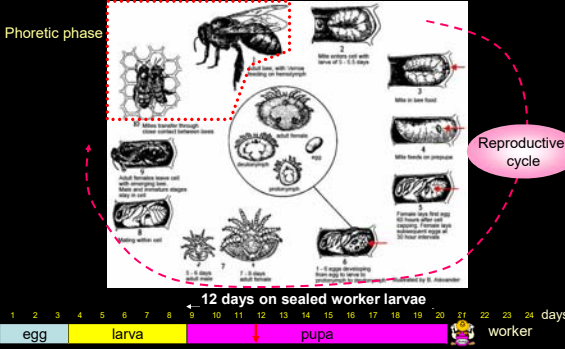
4. Varroa: phoretic stage (3 to 7 days)
 estimated feeding interval: every 4-5 hrs: transmit viruses



<http://cyberbee.net>

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Life History of Varroa



Phoretic phase

Reproductive cycle

12 days on sealed worker larvae

egg larva pupa worker

<http://www.dpi.vic.gov.au/CA25677D007DC87D/Lib/Desc/Ag1183fq15File/AG1183fq1.jpg>

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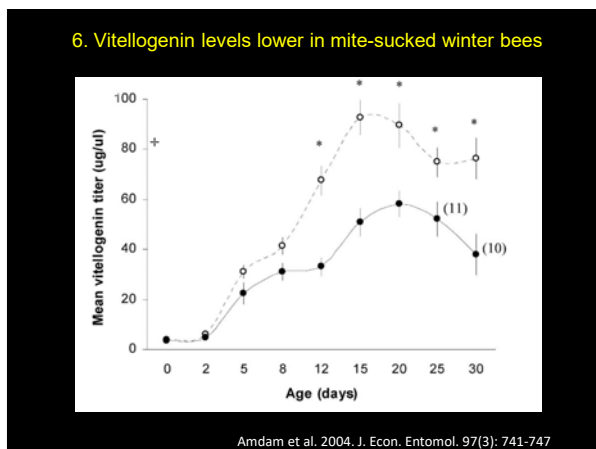
5. Mites transmit viruses
 Of the 13 bee viruses, 3 are transmitted by Varroa

- Acute bee paralysis virus /Kashmir bee virus /Israeli acute paralysis virus
- Aphid lethal paralysis virus & Big Sioux River virus
- Apis mellifera filamentous virus
- Apis iridescent virus
- Arkansas bee virus & Berkeley bee virus
- Bee virus X /Bee virus Y
- Black queen cell virus
- Chronic bee paralysis virus /satellite virus
- Cloudy wing virus
- Deformed wing virus /kakugo virus /Varroa d virus-1 /Egypt bee virus
- Lake Sinai virus-1 /Lake Sinai virus-2
- Sacbrood virus /Thai sacbrood virus
- Slow bee paralysis virus

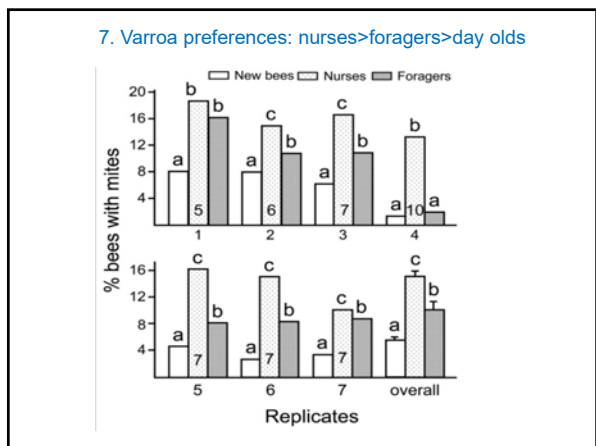
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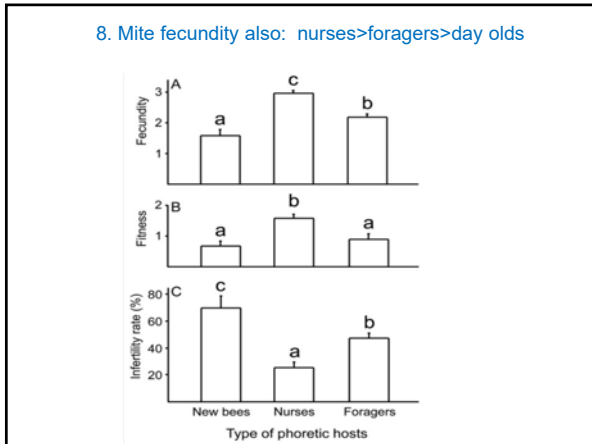
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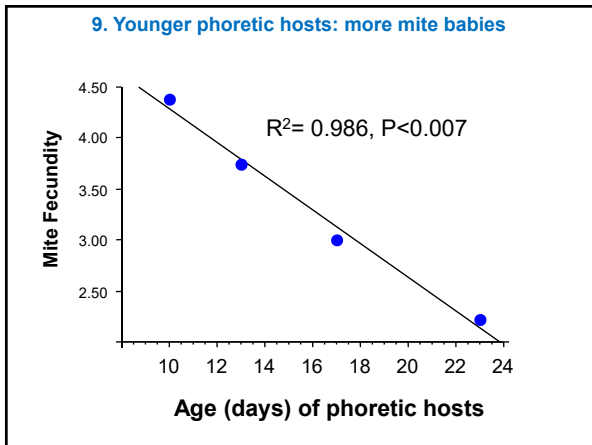
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10. Mite reproduction reduced by

- High relative humidity (RH)
- Larger brood cells
- Small cells does not impede mite growth

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11. Other mite effects

- Reduce worker emergence weight
- Reduce worker longevity
- Immune suppression to workers (controversy)
- Reduce sperm number in drones

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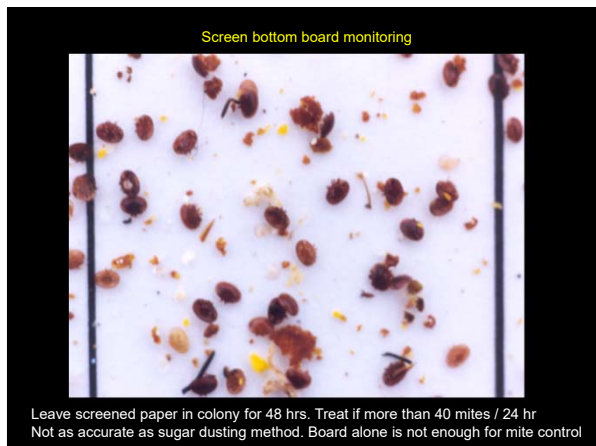
12. Mite monitoring is essential for IPM

1. Uncapping drone brood (not quantitative)
2. Screen bottom board
3. Sugar dusting

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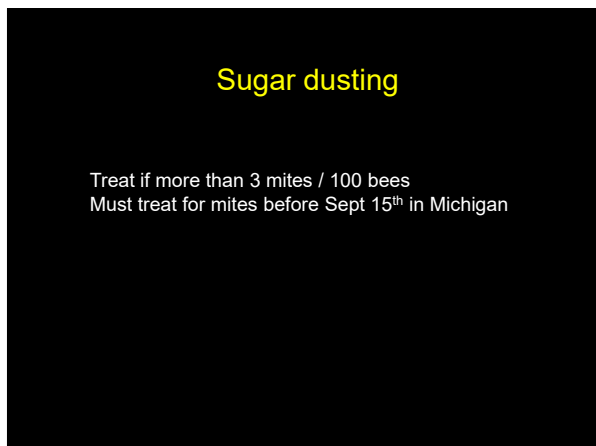
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Treatment:

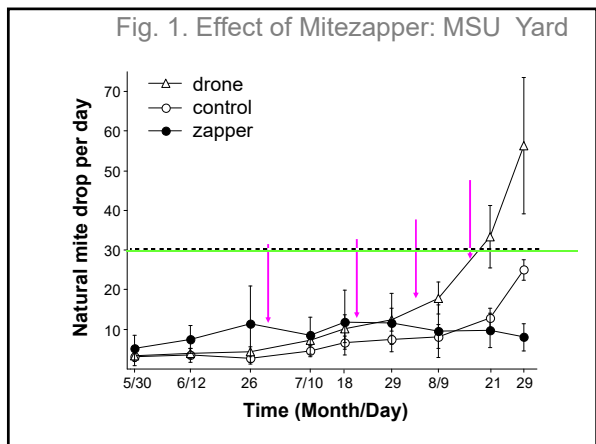
Methods that does not work:

1. Sucracide
2. Small cell foundations
3. Mineral oils
4. Sugar dusting

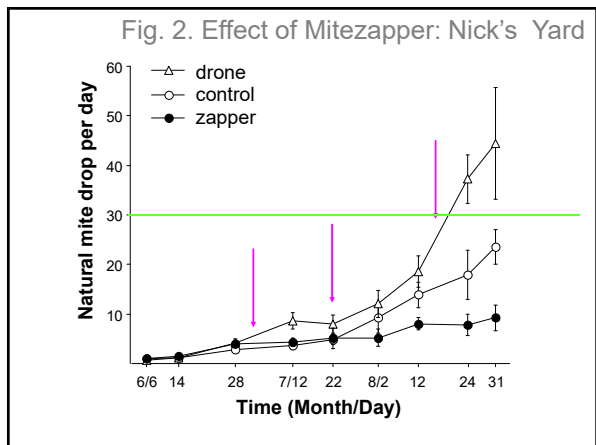
Might work:
 Drone trapping
 Mitezapper (<http://mitezapper.com>)

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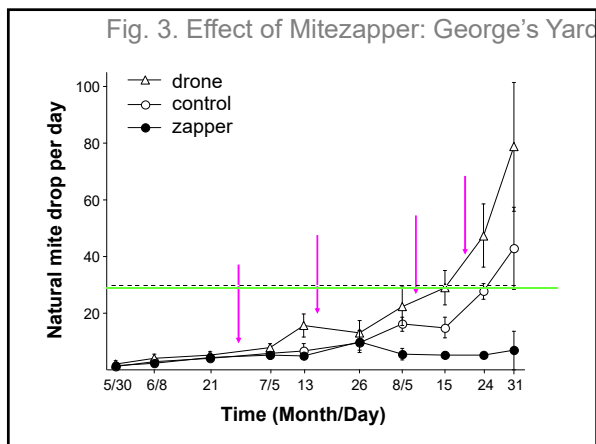
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Chemicals

Chemicals that no longer work

1. Apistan (Fluvalinate)
2. CheckMite + (Coumaphos)

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Hard Chemicals

1. Apivar (amitraz)

Apivar - 50 pk

Product Code: DC-795
 Price: \$129.95 Each
 Shipping Weight: 1.70 pounds
 Quantity in Cart: None
 Quantity:
 Add to Cart Add to Wish List Back

Description

Apivar - 50 pk

North American Beekeepers Now Have an Effective Amitraz-Based Weapon Against Varroa Mites!
Apivar[®]

- Kills up to 99% of mites in one application
- Continuously released in the colony over a six-week period, ensuring healthy and productive hives
- Proven safe and effective for more than 15 years
- Leaves no significant residues in hive products

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Soft chemicals

1. Oxalic acid evaporation

Chemical is very cheap:

by Florida Laboratories

OXALIC ACID 99.6% 2 Lb. Deck, Crystals, Metal Cleaning- Rust Removal

★★★★★ 7 customer reviews

Price: ~~\$11.99~~ (\$1.20 / 10 Items) & FREE Shipping

In Stock.
 Get it as soon as Oct. 26 - 31 when you choose Standard Shipping at checkout.
 Ships from and sold by FlaLab.

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Chemicals

2. Oxalic acid evaporation
Evaporator is about \$80-120

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Chemicals

3. Oxalic acid drench (labor intensive)

35 grams of oxalic acid dihydrate in one L of 1:1 sugar syrup.

Treatments are administered by dripping 5-6 milliliters between all occupied frames.

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4. Formic acid: Miteaway (www.miteaway.com)

Made in the USA or Imported

High Efficacy: MAQS has 90-99 percent efficacy and kills mites under the cap.

No Residue: Treat during the Honey Flow. MAQS leaves no residues in wax or honey.

Ready to Use: MAQS is ready to use. No mixing required.

7 Days: MAQS is a quick 7 day treatment.

Strips do not need to be removed after treatment.

Organic: MAQS is certified Organic through BioGro.

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5. ApiLife Var

Made by Laif Company, Italy.
Available from Brushy Mountain

Thymol and menthol, camphor, eucalyptol
70-95% efficient (most of the time near
70%) against Varroa
Also effective against tracheal mite
Temperature dependent

Taste threshold for thymol is 2 ppm
residue in honey was 0.1 ppm in one study



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6. Apiguard

Very similar to ApiLife Var
Now (2006) a federal registration

Around 70% efficiency against Varroa



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Summary

- Varroa mites transmit viruses, reduce worker weight, longevity, & drone sperm counts
- Treatment threshold is 3% (3 out of 100 workers)
- Treatment:
Apivar, oxalic acid, formic acid, thymol based products, & hopguard.

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Reference

<http://articles.extension.org/pages/65450/varroa-mite-reproductive-biology>

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Mite kits

- Use sugar dusting method to know mite levels
- Always know your mite levels before treating
- Do not create “mite bombs”!
- Check with Meghan Milbrath / Ana Heck

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www.beetography.com Pdf for this presentation at <http://bees.msu.edu>

Thank you!

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