

Complete Beekeeping Short Course

Part 11:  
Managing Parasitic  
Mites



**varroa mites**

- *Varroa destructor*
  - accidentally imported in 1980's
    - from *Apis ceranae*
  - spread rapidly
    - package bees
    - mobile pollinators
    - robbing bees
- decimated feral bee populations
- increased costs of managing bees
- resulted in fewer beekeepers
- increased need for mobile pollinators

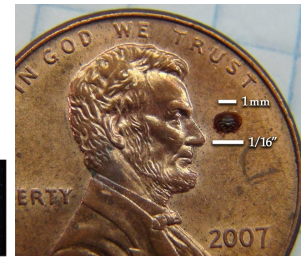
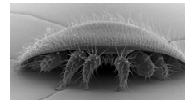


**varroa mites**



**varroa mites**

- the worldwide #1 enemy of honey bees!
  - external parasite
  - feeds on body fluids
    - damage developing pupae
    - steals proteins
    - weakens bee
    - transmits viruses
  - *little mite = a big deal*



**varroa mites**

- reproduction depends on the development of honey bee larvae
- understanding the mite life cycle is key to controlling them



**varroa mite treatments**

*"hard" chemicals*

- miticides
  - lipophilic
  - mites developed resistance
  - chronic exposure to a low dose over time affects bee health
  - cannot be used during honey flow



### varroa mite treatments

**"soft" chemicals**

- organic acids
- HopGuard
  - safe to use during the honey flow
  - food-grade ingredients
  - only works well when there is no brood present

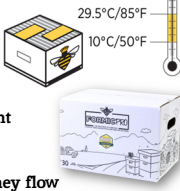







### varroa mite treatments

**"soft" chemicals**

- organic acids
- formic acid
  - vaporizes in the hive
  - temperature dependent
    - daily high: 50-85°F
  - vapors penetrate caps
  - safe to use during honey flow
- dangerous caustic acid!**
  - wear a respirator, eyewear and acid-resistant gloves!

### varroa mite treatments

**"soft" chemicals**

- organic acids
- oxalic acid
  - trickle in sugar syrup
  - vaporize with heat







### varroa mite treatments

**"soft" chemicals**

- organic acids
- oxalic acid
  - trickle in sugar syrup
    - apply 5 ml (1 tsp) onto bees in each occupied bee space between brood combs
    - do not apply to same colony more than once per year
    - only effective when the bee colony is broodless

- 35 g oxalic acid crystals
- 1 L warm 1:1 sugar syrup

- treats up to 15 colonies
- difficult to mix smaller batches accurately
- unstable as liquid, do not store for long periods.



### varroa mite treatments

**"soft" chemicals**

- organic acids
- oxalic acid
  - vaporize with heat
  - seal screen floor
  - smoke bees up from bottom
  - use ¼ teaspoon (2 grams) oxalic acid per hive body
  - connect power and vaporize
  - always follow the directions from vaporizer manufacturer
  - most effective when broodless





### varroa mite treatments

**"soft" chemicals**

- organic acids
- use caution!
  - always use chemical resistant gloves & eye protection when handling acids
    - skin burns
    - eye damage
  - use a respirator to avoid severe respiratory burns
    - lung damage






### varroa mite treatments

**"soft" chemicals**

- essential oils
  - must volatilize
  - temperature dependent
  - follow label instructions
  - don't use during honey flow
    - affects quality of honey

Apiguard
Thymovar
ApilifeVar

- thymol
- eucalyptus
- camphor
- menthol

**READ LABEL FIRST**

### varroa mite treatments

**non-chemical**

- powdered sugar dusting
  - knocks down some phoretic mites
  - labor intensive
    - must repeat often
    - use with a screen bottom board
    - not effective if brood is present
- it's important to count mites before and after any treatment to evaluate its effectiveness

**Effect of weekly sugar dusting (brood present)**

Number of mites per cell

Weeks (sugar dusting once every week)

Important note: this model does not allow for immigration of mites from other colonies, which may be in the hardware. © 2015 Oliver 2015

### varroa mite treatments

**non-chemical**

- cultural control
  - screen bottom board
  - mite-resistant queen stock
    - Varroa Sensitive Hygienic
    - Russian stock
    - "Ankle Biters"
  - there is no 100% mite resistant bee

**Tolerance**  
Most colonies demonstrate tolerance by the number when the infestation of a brood comb typically causes damage

**Resistance**  
Most colonies generally tolerate Varroa infestations because they are highly adaptive and can tolerate a high level of mite infestation

**Colony**  
Beekeeping Colony size  
Low mite resistance

**Brood**  
Beekeeping Colony size  
Beekeeping Colony size  
Beekeeping Colony size  
Beekeeping Colony size  
Beekeeping Colony size

**Varroa**  
Beekeeping Colony size  
Beekeeping Colony size  
Beekeeping Colony size  
Beekeeping Colony size  
Beekeeping Colony size

### varroa mite treatments

**non-chemical**

- cultural control
  - screen bottom board
  - mite-resistant stock
  - drone brood trapping

I can produce an average of 52 female offspring each infested drone cell!

32 X 843 = 26976 mites released just from the cells this size

### varroa mite treatments

**what works best?**

### varroa mite treatments

www.beeinformed.org

Research Portal | Colony Loss Map | Management Survey | MiteCheck | State Reports | Home | Login

#### Management Survey

**Self-Reported Average Winter Losses**

Treatment	Percent Loss (Closest to better)
Amiraz	24.4%
Oxalic Acid	24.1%
Thymol	24.0%
Formic Acid	23.9%
CheckMite+	23.6%
Apistan	23.7%
Powdered Sugar	25.8%
HopGuard	32.6%
No Treatment	33.9%

Number of responses: 11

Respondent Ratio

Percent Loss (Closest to better)

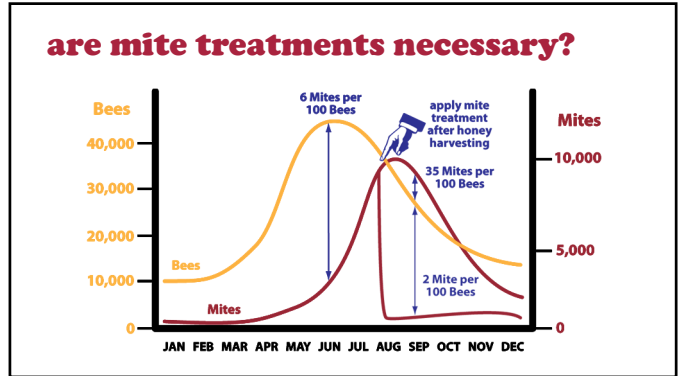
### are mite treatments necessary?



You wouldn't treat a dog like this!




How would you like it?




### are mite treatments necessary?

- the **mite-virus complex** is worse than either mites or viruses on their own
- mite parasites weaken bees and reduce their immune system response to fight pathogens
- mites potentially vector many viruses



### tracheal mites

- Acarapis woodi*
  - internal parasite
  - lives in tracheal tubes
  - feeds on bee's blood
  - breeds in trachea
    - diminishes oxygen supply
    - spreads pathogens
  - symptom: K-wing
    - need microscopic diagnosis for positive identification



### tracheal mites

- Acarapis woodi*
- treatments?
  - menthol crystals
  - thymol treatments
  - genetic resistance

