Complete Beekeeping Short Course

Part 11:

Managing Parasitic Mites

DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

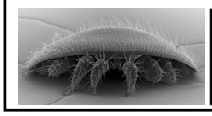
varroa mites

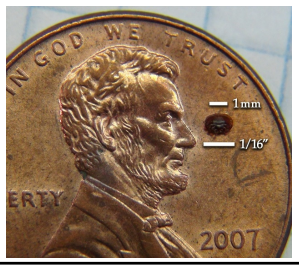
- *Varroa destructor*
  - accidently imported in 1980's
    - from *Apis ceranae*
    - spread rapidly
      - package bees
      - mobile pollinators
      - robbing bees
  - decimated feral bee populations
  - increased costs of managing bees
  - resulted in fewer beekeepers
  - increased need for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

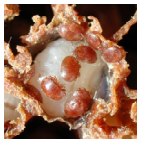
"hard" chemicals

- 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

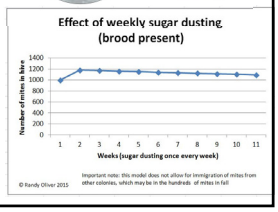
- *thymol*
- *eucalyptus*
- *camphor*
- *menthol*

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

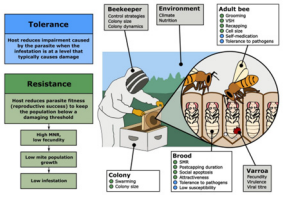
- it's important to count mites before and after any treatment to evaluate its effectiveness



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



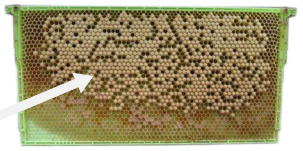
varroa mite treatments

non-chemical

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

I can produce an average of 2 2 female offspring in each infested drone cell!

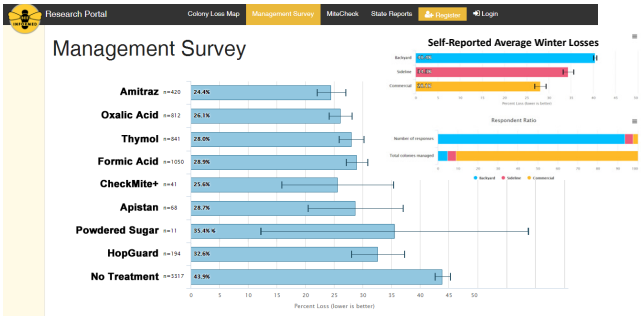
32 X 843 = 2698 mites released just from the cells this side



varroa mite treatments

varroa mite treatments

www.beeinformed.org

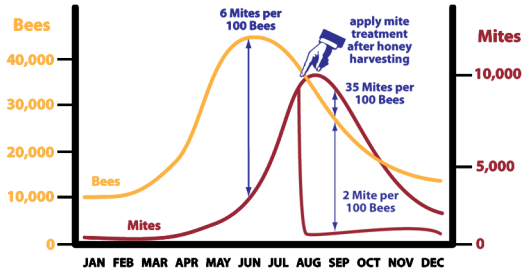


are mite treatments necessary?

You wouldn't treat a dog like this!

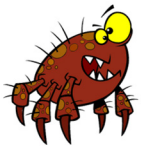
How would you like it?

are mite treatments necessary?



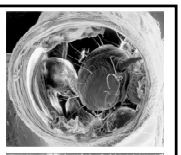
are mite treatments necessary?

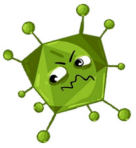
- the mite-virus complex is worse than either mites or viruses on their own
  - mite parasites weaken bees and reduce their immune system response to fight pathogens
  - mites potentially vector many viruses

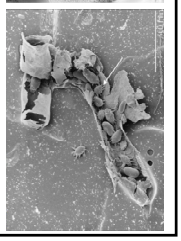


tracheal mites

- *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