Varroa Management Without the Use of Chemicals

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Alternative methods to mite control

“One fist of iron the other of steel if the right one don't get you the left one will”

- Powdered sugar dusting
- Drone traps
- Oxalic acid
- Dripple
- Vaporizing

Passive
Active
What is the Varroa Mite and what does it look like?
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Do a sugar roll test to determine mite population

- Take bees from 3-5 frames
- You want 100-200 bees
- 1 fluid oz = about 100 bees
- ¼ cup = about 200 bees
- Shake or brush bees into a container
- Transfer in a jar with ⅛” hardware cloth lid
- Add 2 Tablespoons of powdered sugar
- Roll bees in jar until they are all coated
- Let them rest for about a minute
- Tip over jar and shake into white bucket.
Do a sugar roll test to determine mite population

- Shake for 1 min.
- Return the bees and sugar back to hive
- Count the number of mites in the bucket
- If there is brood in the colony double your number
  - For example if you count 5 mites/100 that would equal 10 mites/100
- If there is 10 or more mites/100 you should consider treating!
Powdered Sugar Dusting

- One cup of very dry powdered sugar works well for a single or a double deep.
- Sift the sugar over the frames to evenly cover bees.
- Use a ¾” wood frame affixed with some window screen.
- The Scirocco sugar duster from Italy.
- The powdered sugar works by clogging up the mites sticky tarsal pad.
- The powdered sugar does not kill the mites.
How effective is the powdered sugar method?

- Estimated 50% of phoretic mites fall off per treatment
- Reduces the population in broodless hives
- Good on packages, nucs, and swarms
- Get an idea of mite counts
- Works good with bees that already demonstrate a Varroa sensitive hygiene like the Russian Honeybee.
How effective is the powdered sugar method?

- By removing about ½ the phoretic mites you decrease the competition of the remaining mites.
- With higher mite counts multiple mites may infest a drone cell.
- Mite reproduction is lower in multiply cells.
- So one might argue that this may help mites reproduce more efficiently.
- Even weekly treatments would only keep mites at or slightly below initial levels.
- But it is most effective when used with drone traps.
Powdered Sugar Vs. Control
Drone Trapping

- Drone trapping is the process of using drone comb to trap mites.
- The more popular drone trap is a plastic frame with drone size comb imprinted on the foundation.
- Timing is everything.
- Fewer volunteer cells.
- One deep frame a month.
The Oliver Drone Trap

- 2” of foundation on top for honey stores
- Forces the bees to build new foundation
- Mites typically enter drone cells on the 8th or 9th day giving a 2 day trapping window
- Remember remove in 4 weeks
- Can stay in hive all year.
Why is drone trapping effective?

- Mites prefer drone cell 10:1
- Reproduce poorly in worker cells
- Same amount of mites from 50-60 drone cell as you do from 1000 worker cells
- Mites reproduce on a 10 day cycle
- Drone emerge in 24 days
- Workers 21 days
- Drones capped after 11 days
- Workers are capped after 9 days
- Nurse bees frequent drone cells more often.
Cull your drone cells

- Generally you only want about 4% drone comb.
- Just by reducing drone brood from 4% to 3% you would reduce mite population by 25%.
- Even bees with Varroa sensitive hygiene usually only remove infested worker pupae.
Oxalic Acid what is it?

- Oxalic is strange for an organic acid
- Acts more like a mineral acid like sulfuric or hydrochloric
- Other carboxylic acid, like acetic or citric are weak acids
- Oxalic is about 10,000 times “stronger” than the acetic acid in vinegar

Ph of organic acids

- Oxalic acid: 3.00
- Formic acid: 3.47
- Lactic acid: 3.51
- Ascorbic acid: 3.59
- Acetic acid: 3.91
Oxalic Acid where does it come from?

- Oxalic acid is derived from plants and vegetables

Contents of Oxalic acid in vegetables

- Other foods containing Oxalic acid
  - Coffee and tea
  - Nuts and seeds
  - Chocolate and berries
  - Sweet potatoes
  - Popcorn.

We can get it at the hardware store.
How safe is Oxalic Acid?

- Oxalic acids are 70 times more toxic to mite than they are to bees
- It's part of our diet so we have a metabolism to deal with it
- It's already in our honey so bees know how to deal with it as well
- It is not lipid soluble
- Treatments will not increase the concentration of it in the honey
- Rhubarb leaves are poisonous.
Treating with Oxalic Acid: Dribble method

- Concentration of the Oxalic acid rather than the amount
- 35g of Oxalic acid into 1 liter of 50:50 syrup
- Weigh the Oxalic acid instead of measuring by volume
- Do not use hard water
- Use hot water 150’
- Apply 5ml per bee space or 50ml per colony
- Using a 60ml syringe for accuracy
- Using a garden sprayer.
Treating with Oxalic Acid: Dribble method

- Fall/winter and Spring/Summer applications
- Oxalic acid works best in broodless colonies
- Treat only one time or you could harm the colony
- You could expect a mite kill of 90%
- Less effective in summer when brood is present
- It does not kill the mites in the brood
- 3 multiple treatments 7-9 days apart can reduce mites 40-60%
- “If a little is good more must be better” is not the case.
Dripple Method

Pros:
- Good mite kill
- No residues in honey
- Inexpensive
- Relatively safe to mix
- Quick and easy to apply.

Cons:
- Requires broodless colony
- Applied accurately
- Shouldn’t be used more than once in fall/winter
- You have to open the hive
- May be some adult bee mortality due to ingestion
- May cause suppression of brood development.
Treating with Oxalic Acid: Vaporization method

- Oxalic acid is vaporized by heating it
- Once vaporized it can be circulated throughout the colony
- It then recrystallizes and attaches to all surfaces
- Both units take the same dosage of 1-3 grams

There are 2 types of vaporizers:
- Passive
- Active
Treating with Oxalic Acid: Vaporization method

To operate the passive unit

- Put measured amount into cooled vaporizer (1-3 g)(1/2t)
- Insert into hive entrance, and seal up openings
- Energizer unit with battery
- You’ll notice vapor fog escaping
- After about 3 min you should be done.
Treating with Oxalic Acid: Vaporization method

- To operate the active unit
  - Put measured amount into cooled vaporizer (1-3 g)(1/2t)
  - Energizer unit with battery
  - Insert into hive entrance, and seal up openings
  - Turn on heater switch and wait about 30sec
  - Turn on fan switch
  - You’ll notice vapor fog escaping
  - After about 3 min you should be done
  - Don't forget to turn off both switches and let cool before the next hive.
Vaporization method

Pros:

- Oxalic Acid Vaporization is over 96% effective
- Organic treatment
- Do not have to open
- Can be done in winter
- Less toxic to adult bees and brood
- Can use multiple treatments.

Cons:

- You have more chance to come in contact
- The vapor is harmful
- Risk of fire
- Up front cost
- Not effective against mites in brood.
I'm hungry. Please plant flowers.
Happy Beekeeping!