



North American Honey Bee Expo 2025

Louisville, Kentucky

American Bee Federation Conference

Reno, Nevada

American Bee Research Conference

Reno, Nevada

Central Coast Beekeepers

February 20, 2025

Overview

Mites

Varroa Sensitive Hygiene

Treatments

Genetics

Research

Nutrition

Conferences: Knowledge, Tools, Friendship

- Beekeeping: 50% science + 50% art
- Pier reviewed research & experienced beekeepers
 - Avoid internet rabbit hole
 - Avoid wisdom of first year “experts”

They have all the answers or they make them up.

School of Hard Knocks

Increasing costs

30-55% of colonies die annually

Increasing viral loads

Fungicides, insecticides, pesticides & miticides
Infects bees, honey & pollen

Loss of habitat

Treat all colonies, multiple times

Not treating - Wishful thinking



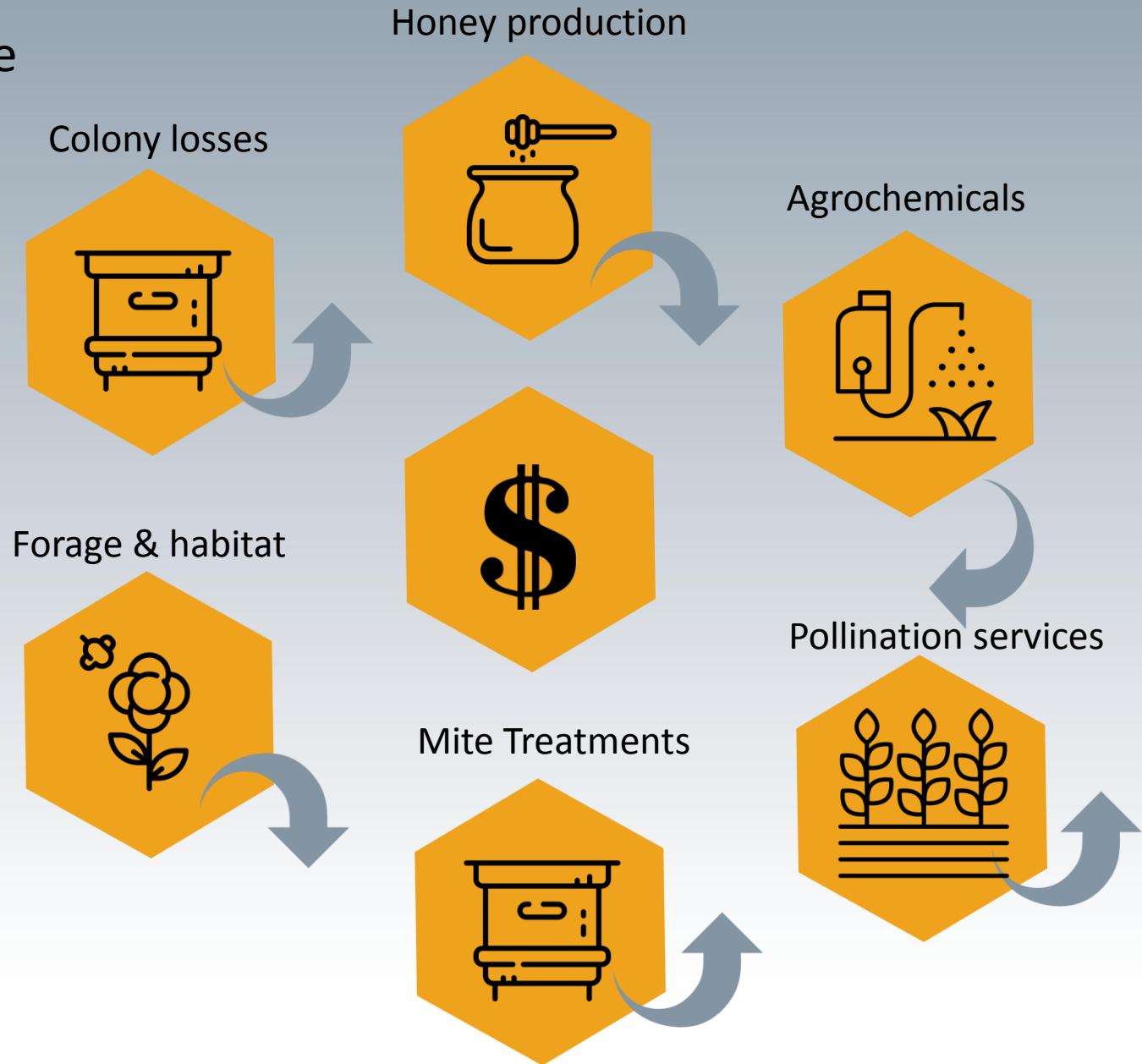
Challenges

Annual Cost of Keeping Colonies Alive
(feed, treat, manage)

Research, Experience

Understand problems

Create tools to address them



School of Hard Knocks

Experience & research

Better management -> healthier bees

Treatment regimens that work

Genetics -> Resistant lines for Varroa

Better understanding of nutrition

“There are no solutions, only tradeoffs.”





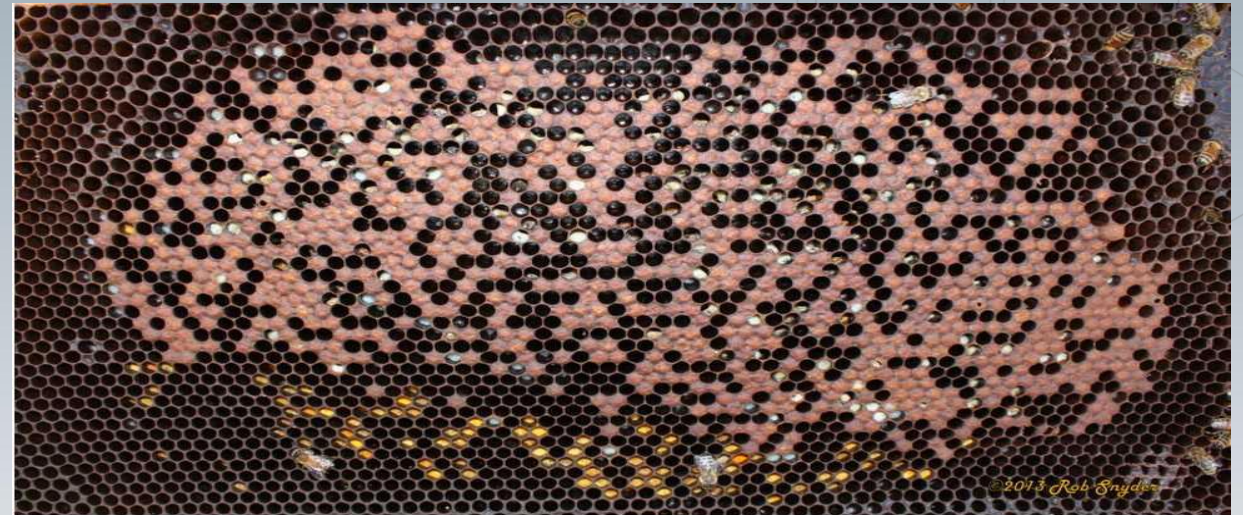
Gilles San Martin

Capped brood = Varroa factory

Mite levels are directly related to how many months you have capped brood

Poor Varroa management -> PMS

Understand exponential growth.
M. Milbraith



Note the spotty brood pattern. The mite infestation is so bad that the bees start to chew down pupa/larvae and stop brood production. You may also notice supercedure cells.

Theory, like mosquitoes, Varroa may need to feed on hemolymph to become fertile

“I don’t treat because I have high levels, I treat to keep mite levels low.” Russ Heitkem

Before Varroa

Viruses existed at low level symptomless infections

Immune system handled it

After Varroa

Injects viruses directly into brood ->

Shortens bees' lives at critical time

Winter bees can die by the end of the year
leaving the diminished colony unable to thermo-regulate

DWV & Chronic Bee Paralysis Virus

Recombinant strains can be extremely virulent.

10 viruses -> 10 billion in 96 hours

Besides mites, spread by food, close association, contact

Even w/o visible indication you may still have DWV

Bees may be passing to queen

Reproduction effected
smaller ovaries
interfere w/egg laying
pheromones
life-span
supercedures



Varroa Mites - What doesn't work



Visual inspections

Screened bottom boards

Small cell foundation

Treatment free methods

Repeated Oxalic Acid Vapor treatments w/capped brood



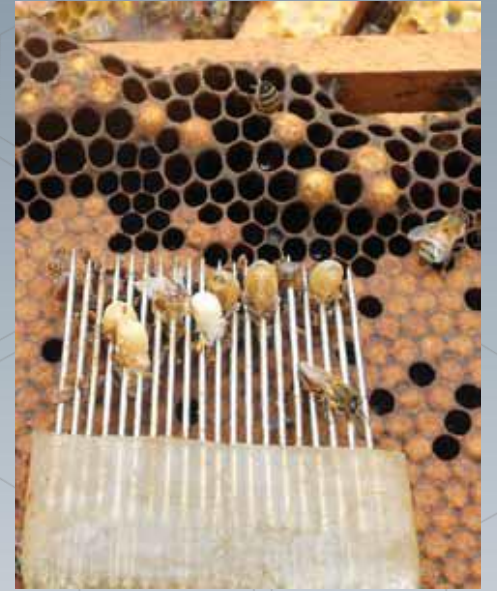
Varrao Detection



Sticky boards are erratic

Sugar shakes & alcohol washes questionable

60-80% in capped brood



One criterion: Watch mite growth over time.

Check bridge comb for mites (it's drone brood)



Treatments Tips

The more you test, the more you know

Test before, during and after treatments.

If you reduce treatments, increase testing.

After honey harvest:

Use FormicPro early -> recover from Queen losses in fall.

It may not be the formic acid that kills the queen.

It may cause bees to attack & kill the queen.



Synthetic treatments

“When in doubt, nuke it out” - Kamon Reynolds

98% of comb is contaminated with synthetic miticides applied by beekeeper.

Fluvalinate (Apistan) worked for 10 years

Coumophos lasted 3 years

Amatraz - not harmful to queens but effect drones

Contaminated bees wax, honey & pollen -> workers, drones & queens:

Life span

Development

Survival

Sperm production & viability

Recommended Organic Regimen

Winter:

Oxalic Acid Vapor (2-3 times)

*** Can only do dribble once. Damages exoskeleton ***

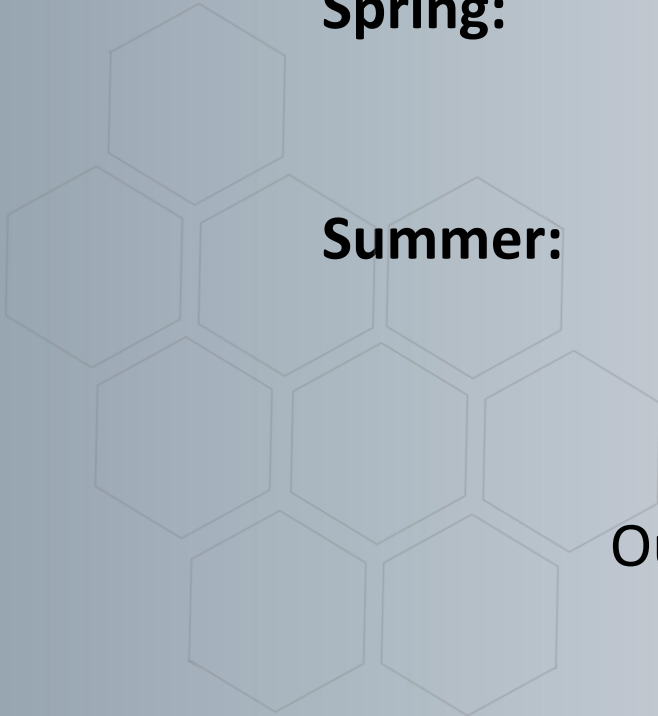
Spring:

Mite load < 2%: oxalic glycerin pads, VarroXSan
Holds levels down

Summer:

Formic, ApiGuard

Outliers no matter what.



The Honey Bee Solution: Genetics

Evolution of the beekeeper

Now I'm going to contradict everything I just told you about treatments.

Unintended consequence: perpetuates Varroa problem.

Keeps bees with inferior genes. (lack Varroa resistance)

Breeds stronger mites.

Culling drone comb can lead to poorly mated queens.

Honey Bee Genetics

Highest rate of genetic recombination of any creature on earth.

Queens mate with 10-20 drones.
Max found 77 drones.

Benefits:

- More likely to get genetic variants
- More genetically diverse bees
 - > fewer mites / less disease
- More likely to survive over-wintering



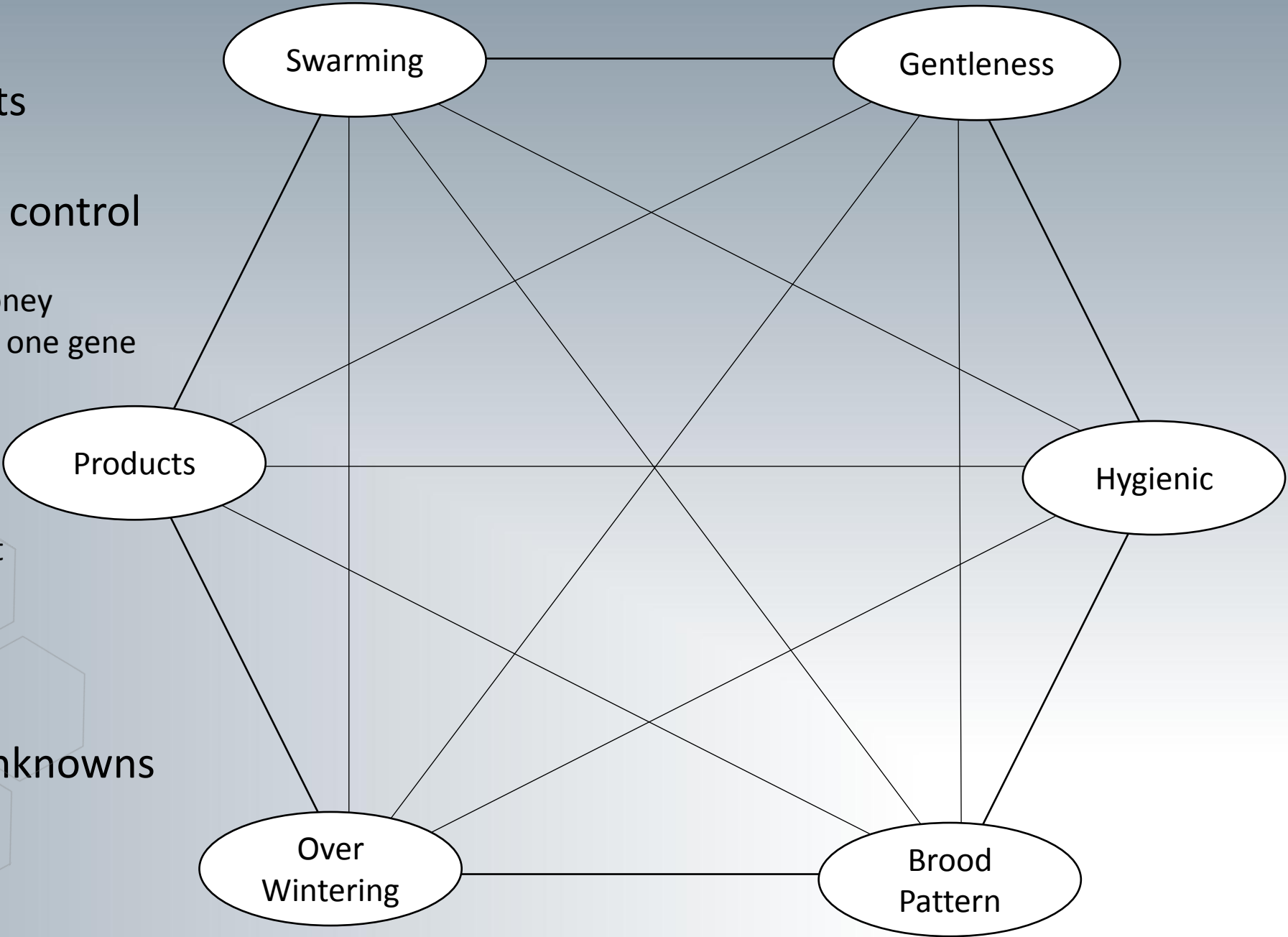
Complex interaction
of genetic traits

Extremely hard to control

Mite resistance, honey
production are not one gene

Genes get bred out

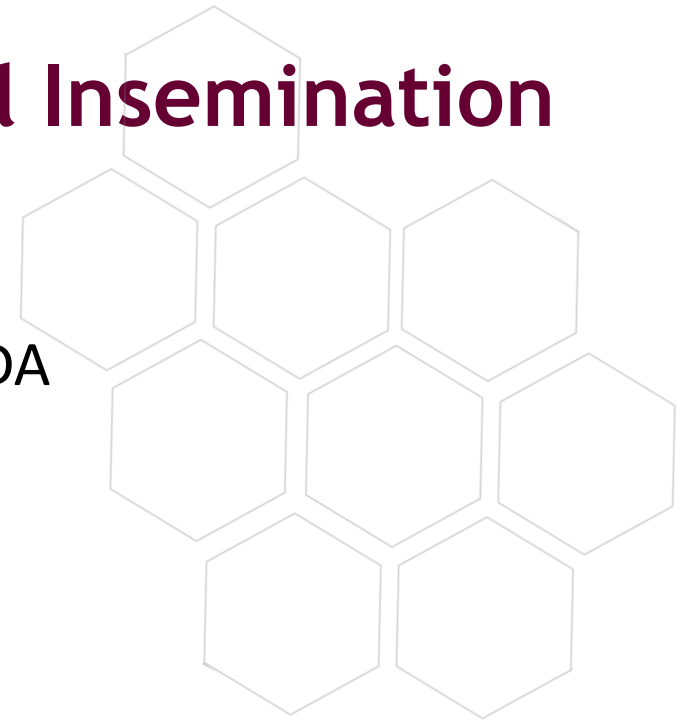
Environment & Unknowns



Varroa Sensitive Hygiene - Instrumental Insemination

Pol-Line Bees - Agricultural Research Service, USDA

www.stevensbeeco.com



Varroa Sensitive Hygiene (VSH)

Uncapping/capping behavior in resistant populations

Details of hygienic behavior has been overlooked

Detector bees

smell the infested brood (UBO - Unhealthy Brood Odor)
chew a pinhole through cell cap

Remover bees

enlarge the hole
eat the infested pupa or removes it
re-seal healthy cells

It is possible that uncapping / recapping interferes with mite reproduction



What to look for

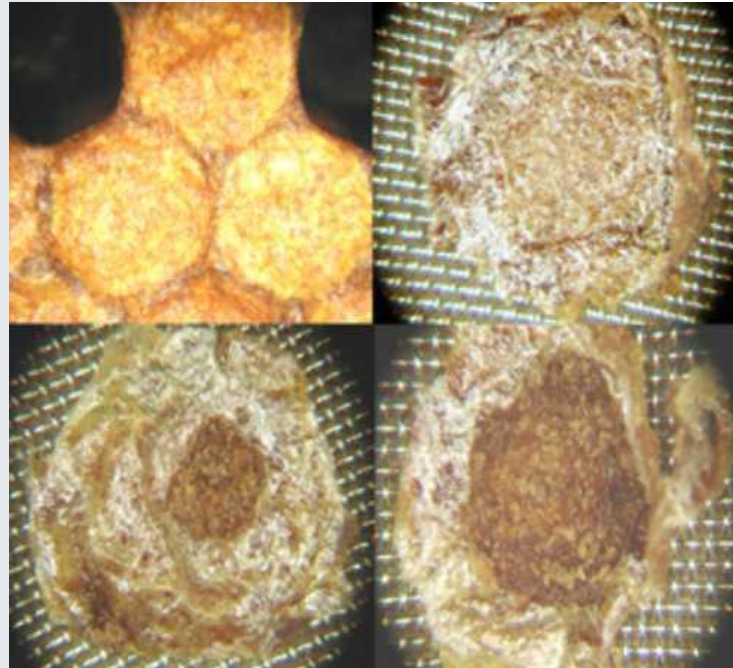
Uncapping of worker brood

Re-Capping of healthy brood

Chewing out of pupae antenna, legs, head & thorax on insert board



Bald brood

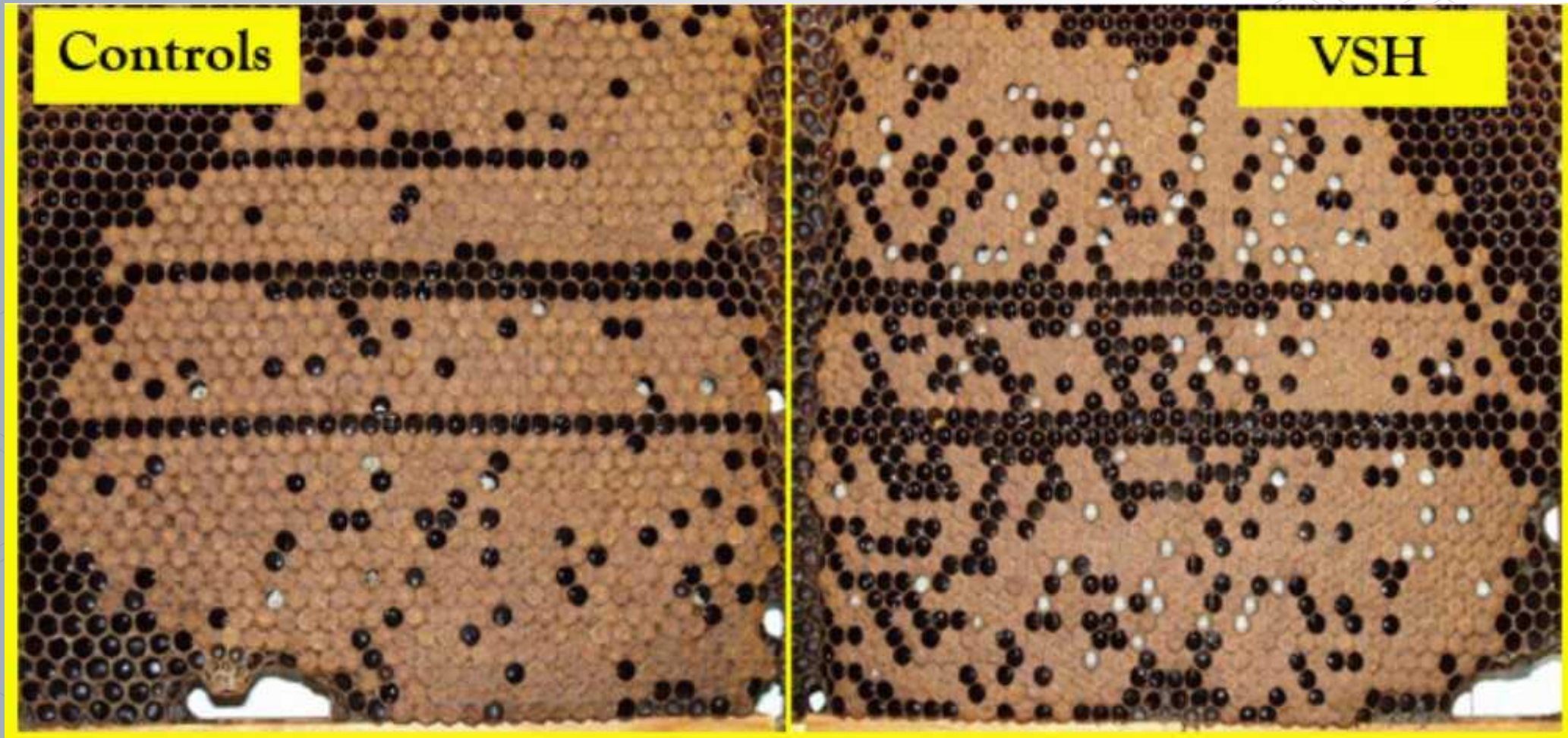


Recapped Brood



Exoskeleton body parts

What to look for



Capped wall to wall brood may indicate bees with little or no resistance

John Kiefus - Bond Method “Live and Let Die”

Could have let bees evolve w/o treatment.

Crops like almonds would have collapsed.





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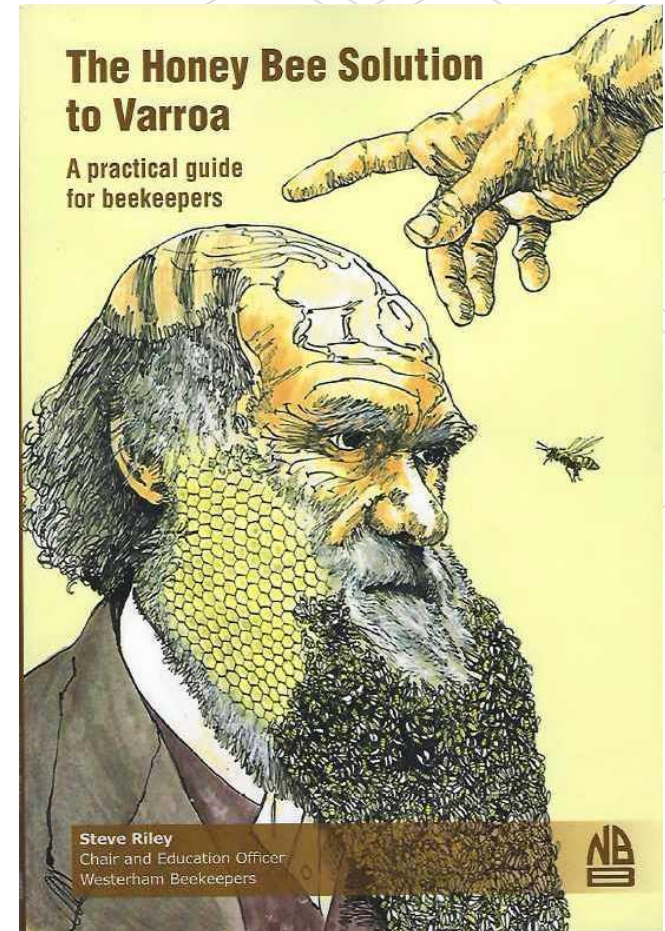


Varroa Sensitive Hygiene - Let bees evolve

Need isolation & controlled drone sources

The Honey Bee Solution to Varroa
by Steve Riley

Randy Oliver has 1000 colonies on 25,000 acres.
100 hours/month to manage w/o treatments.



[Sustainable Beekeepers Guild of Michigan](#)

Traits to look for

Same mite numbers at end of year as when started

Lower viral loads

Fewer supercedures

Successfully over winter

Reduced colony loss



Other Benefits

Reduced miticides needed

May produce less honey but cost of treatments & visits to hives offsets.

Heritability - traits handed down to daughters.



Implementing

Use a camera to record capped frame to be analyzed.

Working as a group pays off.

Three year survival is the milestone to shoot for.

Seems to take ~ 5-8 years after deciding not to treat.

Replace outliers.





Nutrition

Weather (climate change) impacts foraging

Loss of habitat, monocultures -> Poor nutrition

Plant & bee network out of sync

Changes bee behavior.

Nutrition disruption (flowers suffer under high temps)

Effects nutritional quality of pollen & honey

Heat stressed bees eat more pollen

Diet changes DNA of queens' eggs!



Nutrition & Disease

Thinking infected or uninfected is not meaningful

Bees already infected w/soup of viruses & diseases

Nutritional stressors

- Suppresses immune system

- Inhibits olfactory mechanisms

- Unnecessary energy expenditure

- Effects queen health & fertility

- Honey production



Nutrition

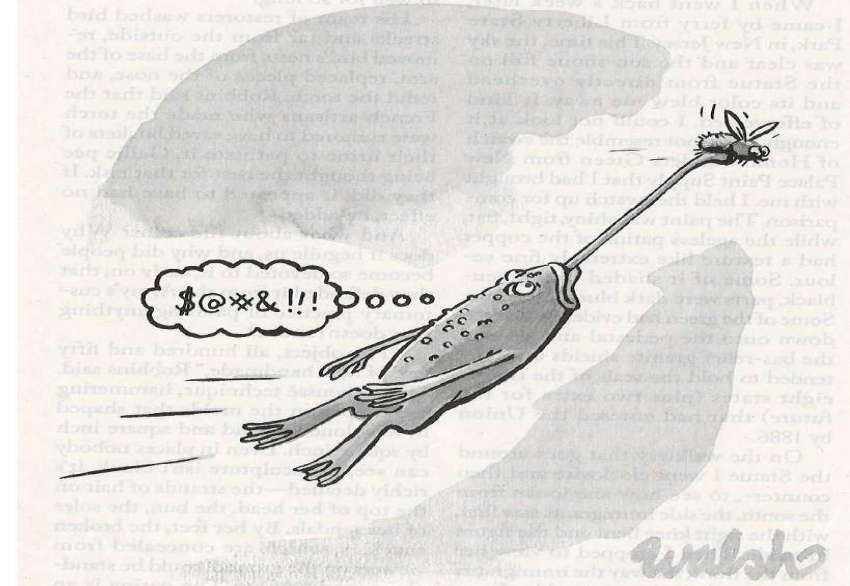
The first line of defense against stressors.

Biggest expense for beekeepers are feeding costs

Forage should be diverse, staggered & abundant

High quality pollen & nectar

Provide proteins, lipids, phyto sterols, ammino acids



Nutrition

The first line of defense against stressors

Priya Chakrabarti Basu - Pollen Nutritional Database

Micro-nutrient profiles don't exist for North America plants
Building a national phenology wheel by month

www.priyadarshinichakrabarti.com

Tropilaelaps



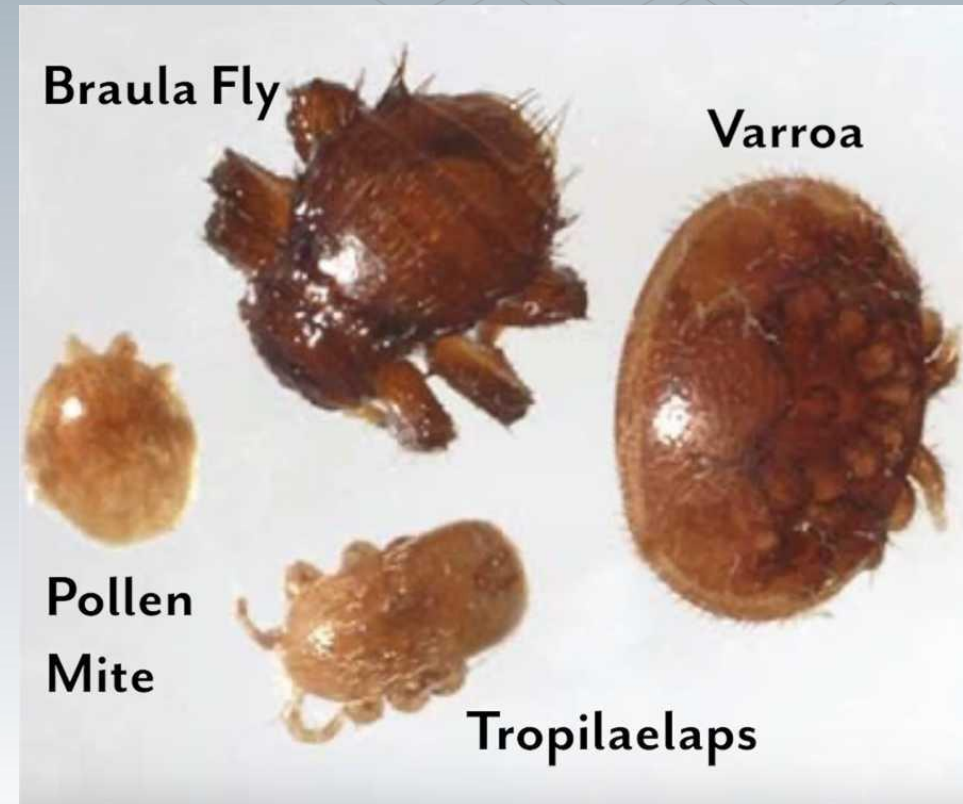
Tropilaelaps: Where are we and what is the plan?

1st identified in Philippines in 60's on rats.

Symptoms -> bald brood & PMS

Can be confused with
Braula & pollen mites

Not generally found on adults.
Mainly lives in capped brood.
Moves fast compared to Varroa.



Tropi Life Cycle

Multiple feeding wounds

-> pass diseases

Out-competes Varroa 10-20x

Swarming or absconding -> spreads Tropi

Cannot survive for long outside of the brood cells
~7 days

Mouth cannot pierce the adult wall membrane.



Detection

-OH, sticky board, sugar shake, uncapping and bumping.

Bump method & sticky boards best.

-OH wash doesn't work on adult bees. Mostly in capped cells.

Visual detection not effective, too small.

Unique moves on top of cells, moves quickly.



Without Treatment

Colony will die in a month.

In some countries 90% of colonies died.



There is hope

Formic Acid & brood breaks most effective.

Splits - strategic splitting



Reporting

Report so we can get on top of it when they show up!

There are concerns /questions about
quarantines and burning of colonies.

Be the first to report & get famous!!!

Videos:

<https://www.projectapism.org/tropi-resources>

[www.honeybee healthcoalition.org](http://www.honeybeehealthcoalition.org)

The End



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