

SUSTAINABLE VARROA CONTROL WITH IPM





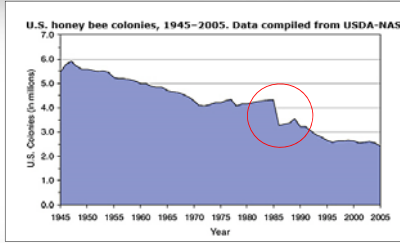

Presented by Lance Wilson
Certified Master Beekeeper-GMBP




VARROA IS PUBLIC ENEMY # 1

- ▶ Arrived in U.S. in 1987
- ▶ 80% of the problem
- ▶ Killed 90-95%
(S. California Study)
- ▶ Associated 85% of collapse in Canada
(Guzman-Novoa2010)
- ▶ Sea Change



MANAGED HONEY BEE COLONIES



Distribution

Host jump in 1957

Photo by LP

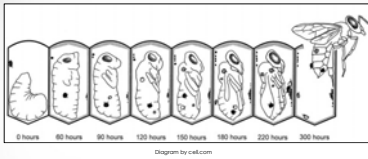
- ▶ Mite
- ▶ Class Arachnida
- ▶ Subclass Acari
- ▶ Ectoparasite obligate

WHAT IS VARROA?

Vertebrate		\neq		Tick-Invertebrate
Vertebrate		\neq		Tapeworm-Invertebrate
Invertebrate		$=$		Invertebrate

WHY SO DIFFICULT?

Two stages- First reproductive



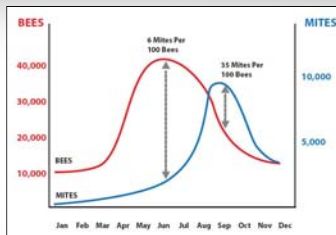
WHAT IS VARROA?





PHORETIC






MITE POPULATION DYNAMICS



Intracellular parasite obligate



When Varroa feeds specific virulent strains are transmitted and amplified. Injection bypasses bees antiviral defenses. (Evans 2014)

VARROA/VIRUS COMPLEX






Photo by Purbhakar



Photo by AP

SYMPTOMS OF COLLAPSE





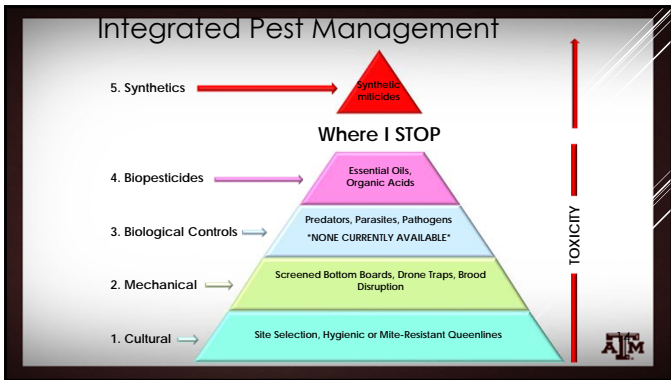
SYMPTOMS OF COLLAPSE




- ▶ Rapid depopulation-two weeks
- ▶ Dead emerging adults

COLLAPSE







"I see nothing!...I know nothing!" beekeeping style no longer works



YOU MUST MONITOR MITE LEVELS



ECONOMIC THRESHOLDS

- ▶ Action (Treatment) Threshold-2%
- ▶ Significant honey loss-3% (Australian and Can.)
- ▶ At 5% collapse is possible/likely (RindererUSDA)
- ▶ Mites/Virus Complex





One cup of powdered sugar per brood box



MONITOR



POWDER SUGAR ACCELERANT



- ▶ Action threshold is 2%
- ▶ No more than 6 mites total
- ▶ 10 minutes



POWDER SUGAR DUSTING



There are things you can do

SO YOU HAVE MITES!
DON'T FREAK OUT!



IPM-Cultural Controls

#1 CONTROL:
manage queen
genetics!!!

1. Cultural → Site Selection, Hygienic or Mite-Resistant Queenlines

TOXICITY



QUEEN GENETICS

Russian

- ▶ Should Stimulate
- ▶ Grooming
- ▶ Biting
- ▶ Small winter cluster
- ▶ Unknown mechanisms



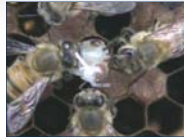
russianbreeder.org



QUEEN GENETICS

Varroa Sensitive Hygiene

- ▶ Alabama Trial- 88% of the colonies remained below economic threshold w/o treatments
- ▶ Migratory Trial- Colonies moved 8K miles yearly and had ½ the mite load as untreated control
- ▶ Pol-Lines
- ▶ Efficacy varies depending on outcrossing and your area



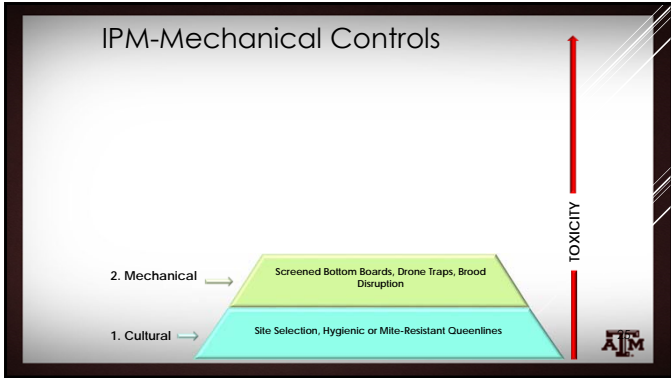
QUEEN GENETICS

Live or Let Die Bees-Survivor Stock

Mode of resistance is a combination of:

- ▶ Biting
- ▶ Grooming
- ▶ Small winter cluster
- ▶ Unknown mechanisms
- ▶ Google "survivor stock honey bees"





- ▶ UF Study
- ▶ Increase ventilation-brood production (Pettis 1999)
- ▶ SBB and mite resistant queens (Delaplane et al. 2005)

MECHANICAL CONTROLS

ATM

MECHANICAL

Drone Trapping

Rotate frames 4 times

- ▶ Laborious
- ▶ Energetically costly
- ▶ Effective UG

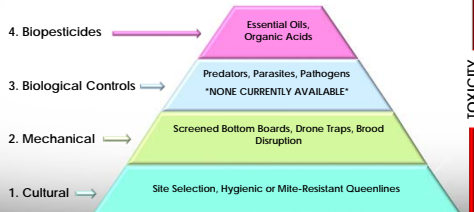
ATM

MECHANICAL-BROOD DISRUPTION

- ▶ Splits-ABJ 6/2011 p.579
- ▶ Queen in cage
- ▶ Requeen with queen cells



IPM-Biopesticides



WHAT ARE BIOPESTICIDES?

- ▶ Essential oils or organic acids –in nature
- ▶ Bees pre-adapted
- ▶ Food grade ingredients
- ▶ Kill Holistically so no resistance
- ▶ Don't contaminate wax or honey




 **HopGuard™**




BIOPESTICIDE-HOPGUARD II



- ▶ 1 strip for every 5 frames of bees in brood box
- ▶ 1 or 2 applications every 14 days
- ▶ Most effective with little brood-Ellis Study
- ▶ Not temperature dependent!
- ▶ Can use with honey supers on!
- ▶ Very little stress!
- ▶ Mann Lake \$42 or \$3.50 per treat.



BIOPESTICIDE-HOPGUARD II



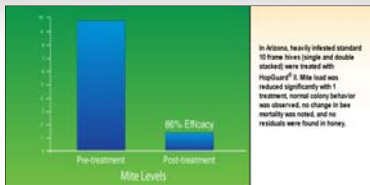
BIOPESTICIDE-HOPGUARD II





HOPGUARD II





In Arizona, heavily infested standard 10 frame hive colonies and double stacked were treated with HopGuard II. Mite load was reduced significantly with 1 treatment, normal colony behavior was observed, no change in bee mortality was noted, and no residues were found in honey.

BUT WHAT IS THE EFFICACY?



NOT VERY EFFECTIVE WHEN BROOD IS PRESENT



For more information on this trial ABJ 12/2014 p. 1345





BIOPESTICIDE-APIGUARD

Up to
93%
Efficacy



- ▶ Thymol Fumigant
- ▶ Apply 2 times 14 days apart
- ▶ Some brood kill
- ▶ Should take supers off
- ▶ Tray on top of brood area
- ▶ 60F-104F temperature range
- ▶ Dadant-\$32.95 for 10 tray box



BIOPESTICIDE-APIGUARD





BIOPESTICIDE-API LIFE VAR



- ▶ France 12 years
- ▶ Thymol-Fumigant
- ▶ 3 applications 7-10 days apart
- ▶ Will not kill under the cap
- ▶ Must remove honey supers
- ▶ Temps must be 54F-90F
- ▶ Brushy Mountain-\$36.50

Up to
95%
Efficacy



BIOPESTICIDE-API LIFE VAR





BIOPESTICIDE-MAQS



- ▶ Formic acid fumigant
- ▶ Stressful
- ▶ Can Kill some brood
- ▶ Kills mites under the cap!
- ▶ Can be used with supers on!
- ▶ Knock out or knock back option



BIOPESTICIDE-MAQS



- ▶ One treatment!
- ▶ Kills brood under the cap!
- ▶ Can use during nectar flow!
- ▶ Allow queen to move above
- ▶ Use 50F-92F
- ▶ Entrance fully open-6frame min.
- ▶ See ABJ, 9/2011 p. 841



Up to
70-95%
Efficacy

MAQS INFO



Oxalis

Defensive chemical in plants



Photo Randy Oliver





Image Randy Oliver

Mite treatment is the same
as one serving of spinach per hive



Serving the industry for more than 50 years
Brushy Mountain Bee Farm
 BEST QUALITY | BEST SERVICE | BEST SUPPORT

Home Quick Order Request Catalog Bee Educated Account Login

Online Store

Search Results for "oxalic"

Item #	Image	Description
727		Oxalic Acid 1.5 cc 100 Pack
727A		Oxalic Acid 1.5 cc 100 Pack

Free Shipping on Most Orders Over \$150*

ATM

- ▶ Put packet in 1 liter of soft water
- ▶ Add sugar
- ▶ Use solution immediately or store

- ▶ 1.5 cc per seam
- ▶ Not more than 50cc
- ▶ Apply 35F-90F
- ▶ No or little brood
- ▶ Mechanism not known

Photo Randy Oliver

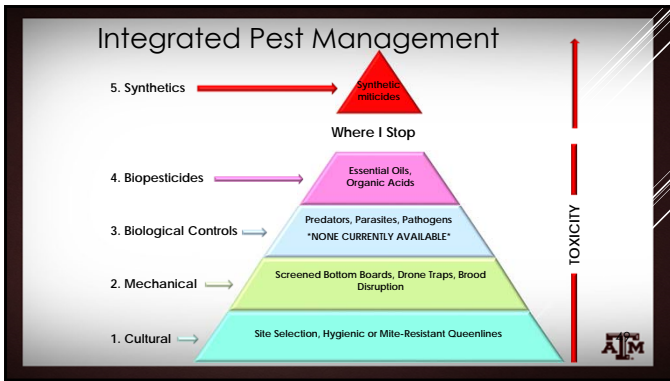
ATM

- ▶ Not Lipophilic so not retained in the wax
- ▶ Broad temperate range 35F-90F
- ▶ Short treatment time
- ▶ Inexpensive
- ▶ Naturally organic
- ▶ Resistance not likely
- ▶ www.spiralhornapiary.com

OXALIC ACID

Up to
82-99%
 Efficacy
 with No Brood

ATM





SYNTHETICS PESTICIDES

- Found to reduce sperm viability
- Found to cause larvae death
- Can contaminate wax and honey
- Produces nasty synergistic effects
- Produces sublethal effects
- Inevitably causes resistance so unsustainable

ATM

CONTROVERSIAL MECHANICAL CONTROLS



Powder Dusting



CONTROVERSIAL MECHANICAL CONTROLS



POWDERED SUGAR (in hive application)

- ▶ Florida study-no difference over 11 months (Ellis-2009)
- ▶ UGA Study-Did not improve colony survival rates...same as non treated controls. (Nolan-2013)



LOOK AT THE MATH



If Sugar dusting knocks off half of the phoretic mites
As much as 80% of the mites can be under the cap
One sugar dusting will eliminate 10% of the mites
Two sugar dustings a month will eliminate 20% of the mites.
But the mites double their population every 30 days so you still are getting an 80% increase in you mite population after treatments



- ▶ The belief that the use of foundation with smaller cell sizes will lower mite loads
- ▶ UGA Study-2009
- ▶ UF Study-2009
- ▶ New Zealand Study-2008



CONTROVERSIAL-SMALL CELL



TAKE AWAY



- ▶ Know your mite levels!
- ▶ Use mite resistant stock
- ▶ Use a combination of Bio-technical strategies before you escalate
- ▶ Use organic bio-pesticides only if stronger measures are needed
- ▶ Must be proactive!!!



RESOURCES



lance@beekeepinghelp.com