

# It's Fall – Time to Kick Out Varroa !



**SOBA Bee School**  
**August 1, 2015**

While we are trying to stay cool in August, the bees are starting to prepare for winter.



# Fall starts in August:

Workers kick out drones

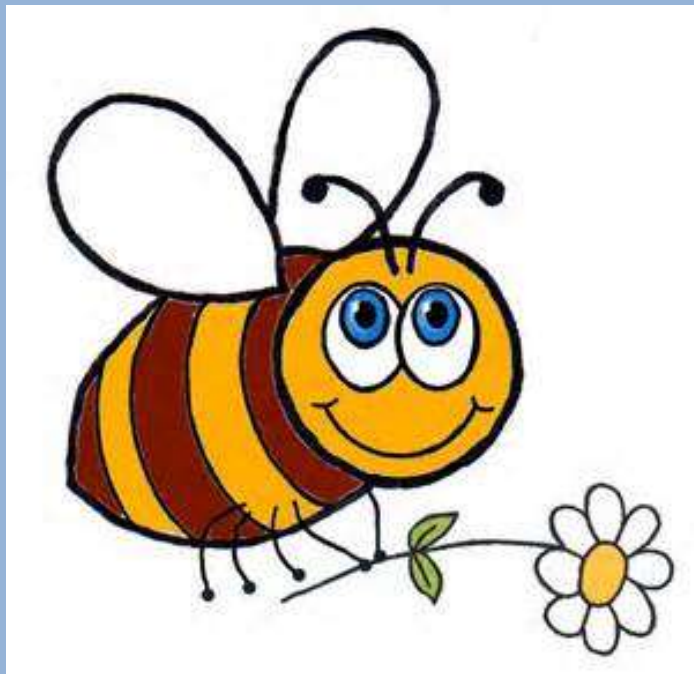


Beekeepers kick out Varroa



# Transitioning to Fall...

**From Sweet Bee**

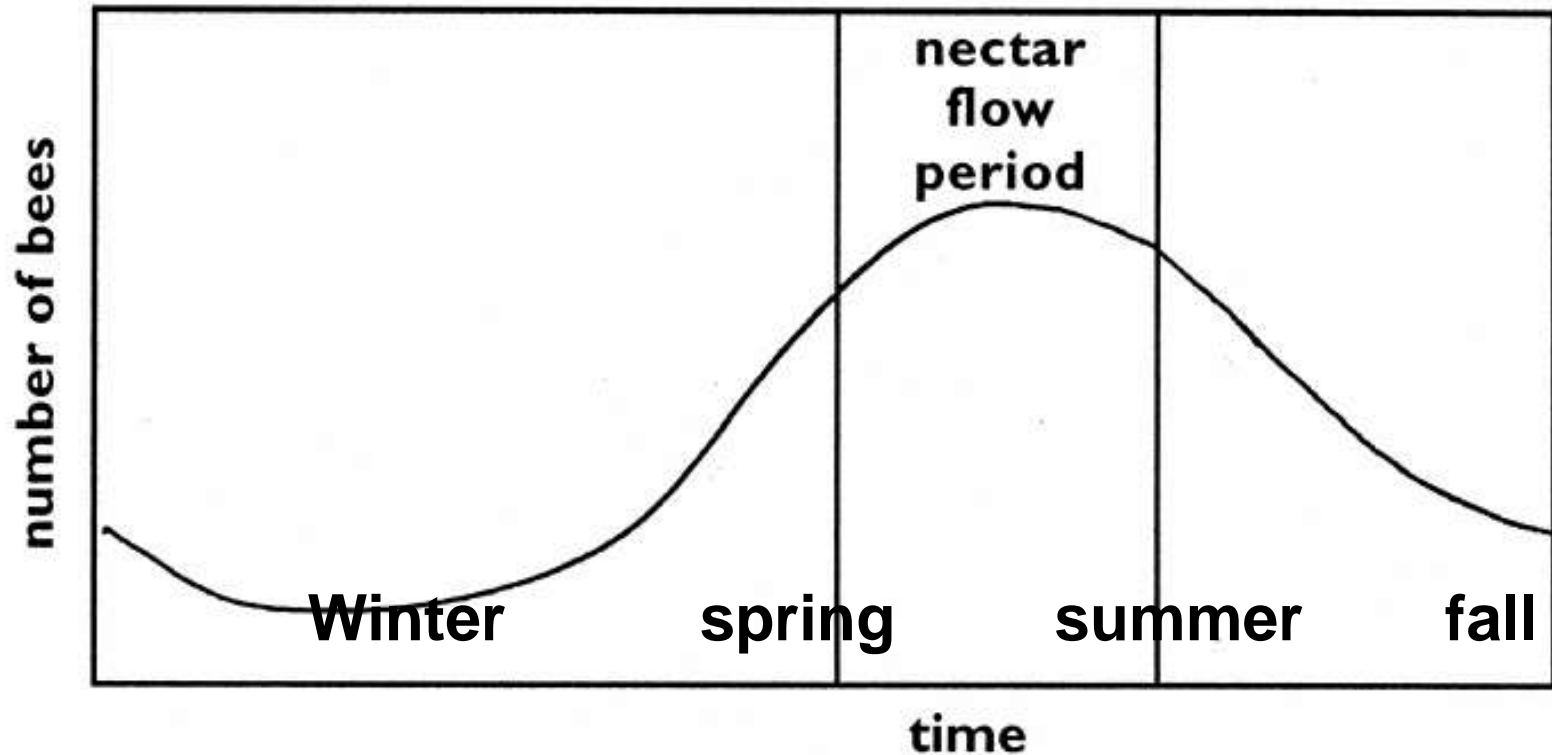


**To Protecting Their Sweets**





# Queen Continues to Reduce Egg Laying



# Phone call phenology



“ My hive was fine in the fall and I saw bees on nice winter days but now there are lots of dead bees and no honey. What happened?”

# Fall can be precursor of winter losses

- “The parasitic mite *Varroa destructor* remains the single most detrimental pest of honey bees, and is closely associated with overwintering colony declines.”

# What are Varroa mites?

Varroa Mite



Tick





# Getting to Know You





# Why Are Varroa a Problem Now?

- 1987 this mite made a species jump right onto our bees
- Originally found on another species of honey bee: *Apis ceranae*
- Our honey bees *Apis mellifera* had no resistance
- *Varroa* mites vector viruses

# Vector at work



# Compromised immune system

**Humans get viruses**

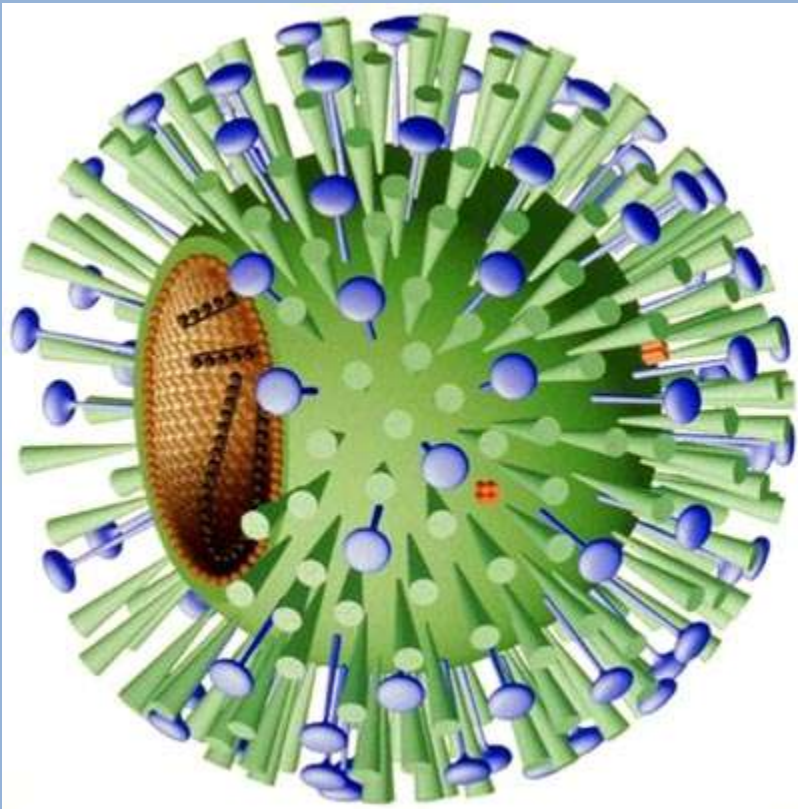


**So do bees**





# Why be concerned?



- Vector viruses
- Impair the bees' immune system
- Interfere with the bees' ability to produce long lived winter bees

# Consequences of not dealing with Varroa: Your colony dies



# Consequences



You have to  
replace your bees



# Consequences



You create  
a Varroa  
Bomb

# Consequences: Bees with Varroa mites drift to neighboring hives



My hive next door is crashing. I'm moving in with you.



# Consequences: No Fat Winter Bees



Winter bee

# Consequences: Low Population



# Know Your Enemy: Varroa Mite Life Cycle



Joe Traynor



# Varroa mites can be found 2 ways in a bee hive

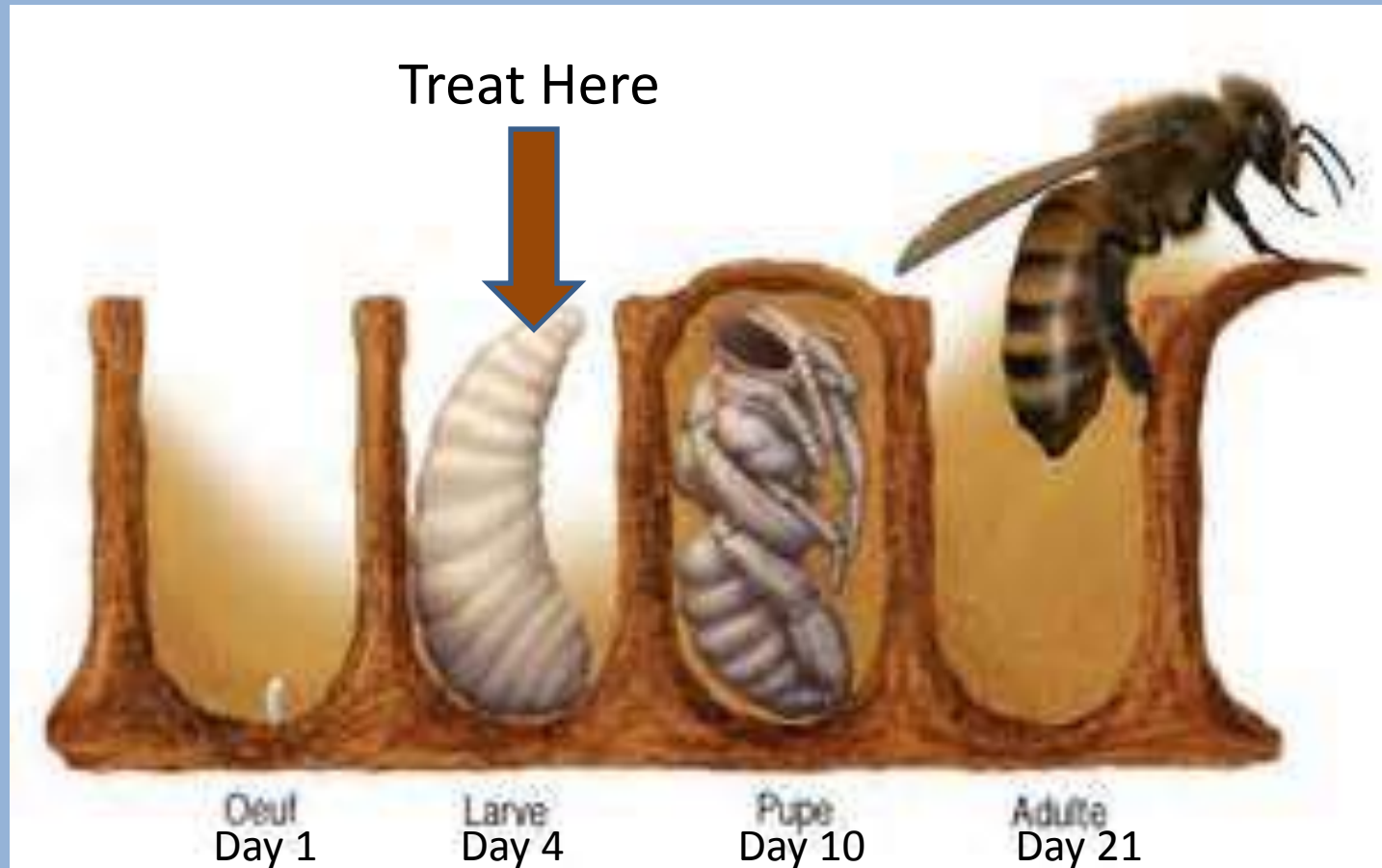


Phoretic mite on bee



Mites under capped cells

Remember to treat before the first brood is about to be capped (by day 8)





# How do you know your colony has Varroa Mites?

- All colonies have Varroa mites
- Symptoms of Varroa mites



## Varroa Mite Indicators Outside the Hive:



Bees crawling on  
the ground in  
front of the hive

# Varroa Mite Indicators outside the hive:

Healthy Bee



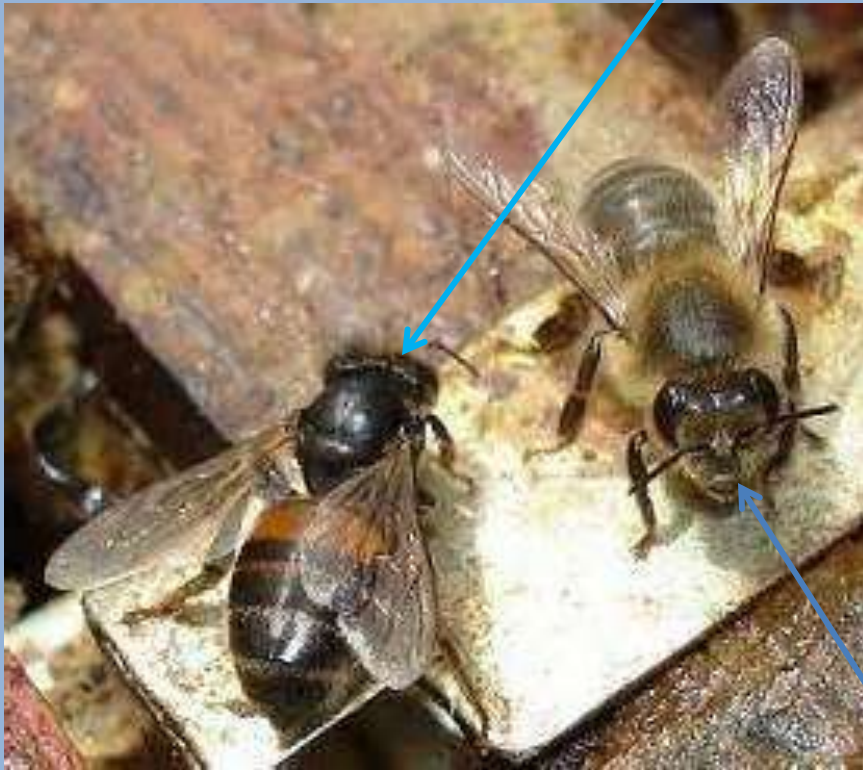
Disfigured, stunted adult bees, with deformed legs or wings or both



Disfigured  
Bee



# Varroa Mite indicators outside the hive: Acute Bee Paralysis aka Hairless Black



- Caused a virus vectored by Varroa mites
- Bee tremble and can not fly
- No treatment except varroa control

Normal bee



# Varroa Mite indicators outside the hive:



a hitchhiker on  
the bee

# Varroa Mite Indicators outside the hive:

Discarded larvae on  
the landing board  
usually in the  
morning



# Varroa mite indicators outside the hive :

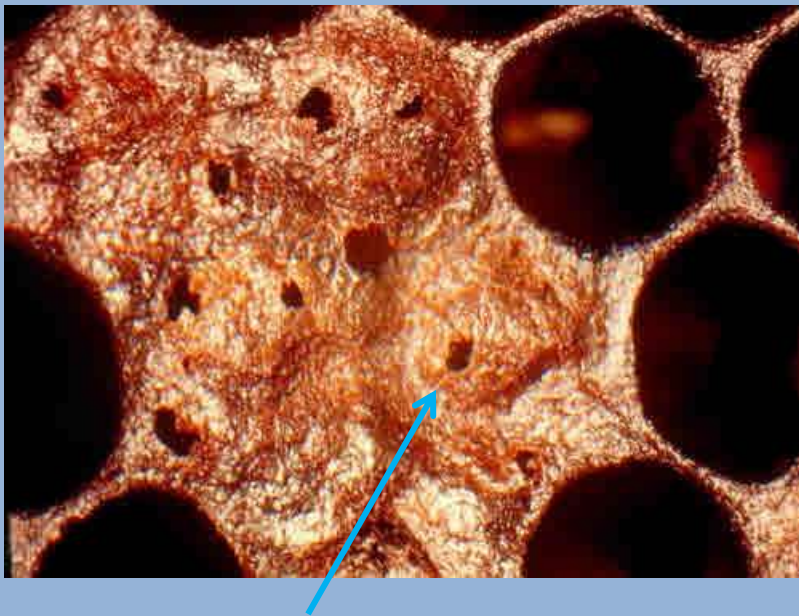


Mites on the collection board



# Varroa mite Indicators inside the hive:

Infested capped brood



Perforated cap

Normal capped brood



Not quite capped



# Varroa mite indicators inside the hive: Varroa mites visible on pupae



Varroa on drone pupa

# Varroa Mite Indicators: inside the hive

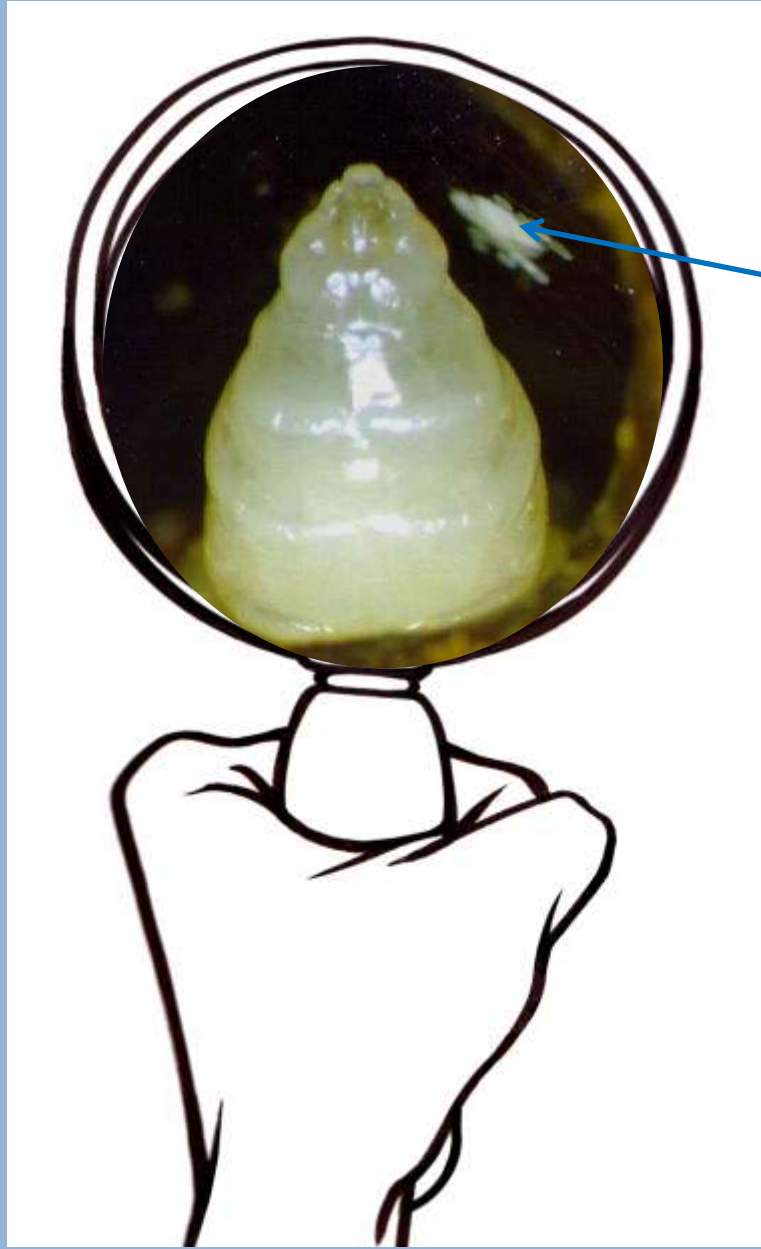


Normal Pattern

Spotty brood pattern



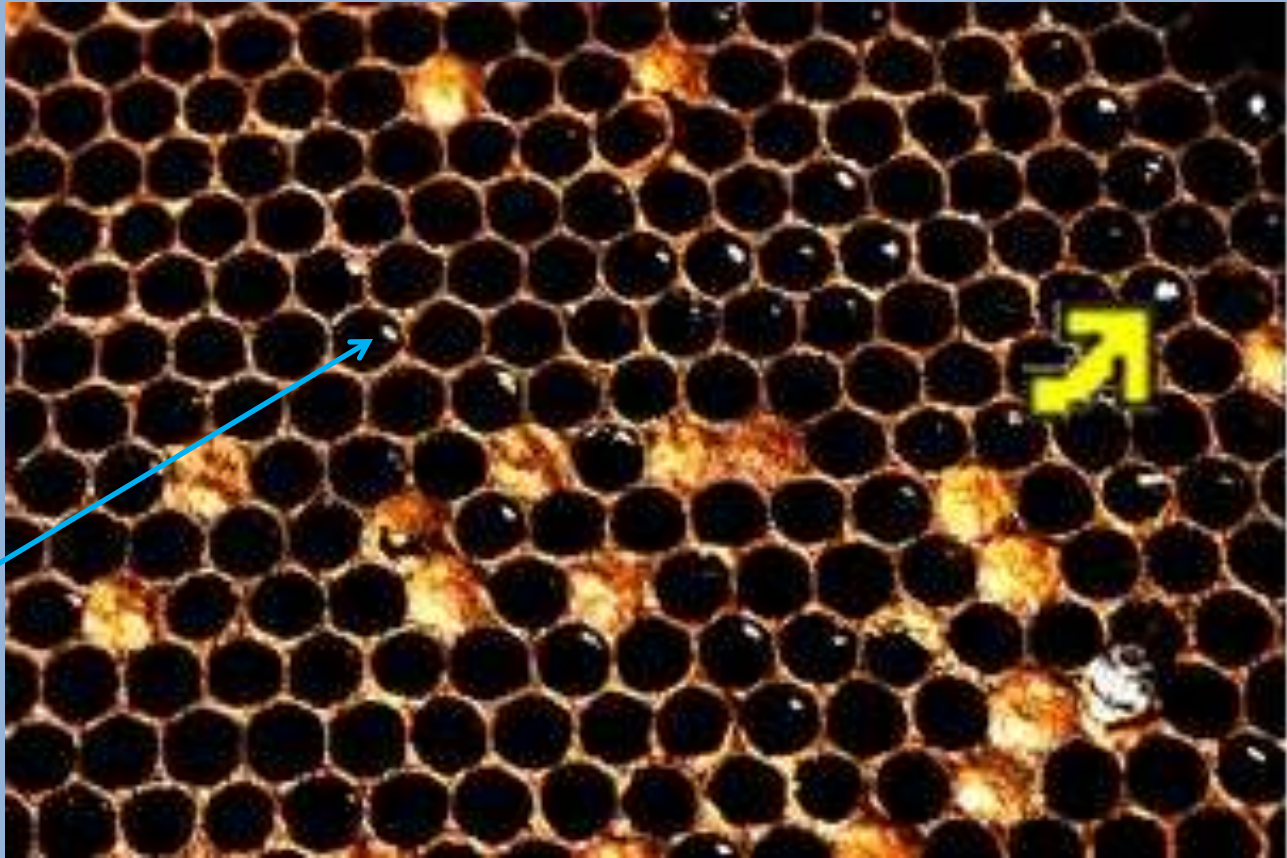
Spotty Pattern



?



# Varroa mite indicators inside the hive: Poop can be seen in cells





# How do you know your colony has Varroa mites?

- All colonies have Varroa mites
- **The question is how many mites?**
- How are the numbers trending?

# Economic threshold

- Point at which the level of infestation is too high
- Various ways to determine this
  - Alcohol wash
  - Sugar shake
  - Ether roll
  - Collection board
- For more details go to [www.scientificbeekeeping.com](http://www.scientificbeekeeping.com)

# Ways to Monitor Mite Levels

Three ways to monitor

1. “Jar” samples—ether roll or powdered sugar shake; alcohol or detergent wash
2. Natural mite fall caught on a sticky board
3. Brood sampling with a cappings fork

# Alcohol wash = Gold Standard

## Goal = Between 1 – 3%



Fall 1-3%

Spring 1%



# Sugar Shake



# Ether Roll



Randy Oliver at Scientific Beekeeping

# 24 hour natural drop



Screened Bottom Board  
Collection Board in place

# Collection board for 24 hour natural drop



Use hard plastic

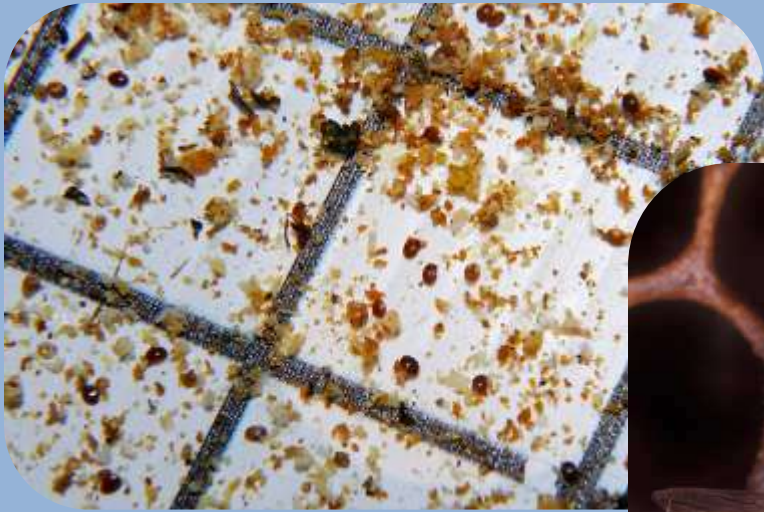
Draw a counting grid

Spray with Pam

Slip into slot in screened  
bottom board

Frequency: monthly  
except winter





Notice the 8 legs

# How are your mite numbers trending?

The trend is what is important

Watch for false negatives



Early season (March)

Less than 10 mites

on the collection board  
in a 24 hour period

Late season: (August)

Less than 23 mites on

collection board/24 hours

# Brood Sampling



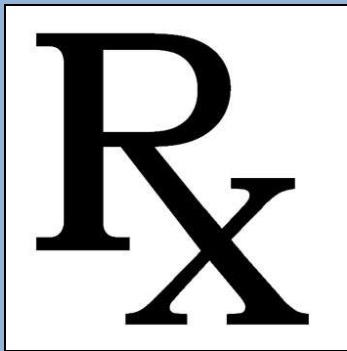


Maintain Varroa below the economic threshold: Do a Varroa Count



**You MUST control Varroa mites!**





# Treatment & Prevention

## Weapons of Mite Destruction



- ❖ IPM
- ❖ Soft chemicals
- ❖ Hard chemicals
- ❖ Oxalic Acid
- ❖ Genetics
- ❖ Do nothing

# Varroa Mite Control Options

- Monitor your mite loads whether you plan to treat or not
- Know your mite load at the time you treat
- Follow the product directions EXACTLY
- Talk to experienced, successful beekeepers to learn what has worked for them
- Ultimately it is your decision

# If you treat one colony, you need to treat them all

- Varroa mites are like cigarette smoke
- Both can kill and
- Both spread by drifting



Varroa Mite Control Methods		
<b>Control Method: IPM</b>	<b>Pros</b>	<b>Cons</b>
<b>Drone Brood management</b>	<ul style="list-style-type: none"> <li>Eliminates Varroa mites before they can reproduce</li> </ul>	<ul style="list-style-type: none"> <li>Very labor intensive, disruptive</li> <li>Only removes Varroa under capped brood</li> <li>May affect DCA</li> </ul>
<b>Powdered Sugar</b>	<ul style="list-style-type: none"> <li>Completely organic</li> <li>Quick mite knock down</li> <li>Good treatment for swarms (no brood)</li> </ul>	<ul style="list-style-type: none"> <li>Very labor intensive</li> <li>Must follow application schedule every 3 days for 21 days total</li> </ul>
<b>Screen bottom boards</b>	<ul style="list-style-type: none"> <li>Mechanical Varroa control</li> </ul>	<ul style="list-style-type: none"> <li>Not effective alone</li> </ul>
<b>Swarming allowed/cage queen</b>	<ul style="list-style-type: none"> <li>Breaks brood cycle</li> </ul>	<ul style="list-style-type: none"> <li>Not good for neighbor relations</li> <li>Seriously impacts hive population</li> </ul>
<b>Control Method: Soft Chemicals</b>	<b>Pros</b>	<b>Cons</b>
<b>Thymol (essential oil)</b> <ul style="list-style-type: none"> <li>Api-Life-Var</li> <li>Apiguard</li> </ul>	<ul style="list-style-type: none"> <li>Naturally occurring organic chemical</li> <li>Mites have not built up resistance</li> <li>Quick mite knock down</li> </ul>	<ul style="list-style-type: none"> <li>Very aromatic</li> <li>Can not use with honey supers in place</li> <li>Requires blocking screened bottom board</li> <li>Only affects phoretic mites</li> <li>Temperature dependent</li> </ul>
<b>Hop Guard (beta acid)</b>	<ul style="list-style-type: none"> <li>Organic acid</li> <li>Can apply when honey supers in place</li> <li>Quick mite knock down</li> <li>Varroa have not build up resistance</li> <li>Easy application</li> <li>Not temperature dependent above 50 degrees F</li> </ul>	<ul style="list-style-type: none"> <li>Only kills phoretic mites</li> <li>Short term solution</li> <li>Unlikely to be used alone for season-long mite control</li> </ul>
<b>Mite Away Quick Strip (MAQS) (formic acid)</b>	<ul style="list-style-type: none"> <li>Only miticide that kills Varroa in capped brood cells as well as phoretic mites, 7 day treatment</li> <li>Honey supers can be in place when applied</li> <li>Naturally occurring organic acid</li> </ul>	<ul style="list-style-type: none"> <li>Possible affect on egg laying</li> <li>Requires blocking screened bottom board</li> <li>Requires minimum 6 frames of bees</li> <li>Temperature dependent after 93 degrees</li> </ul>
<b>Control Method: Hard Chemicals</b>	<b>Pros</b>	<b>Cons</b>
<b>Apistan</b>	<ul style="list-style-type: none"> <li>Varroa kill over full treatment cycle of 42 – 54 days</li> </ul>	<ul style="list-style-type: none"> <li>Varroa resistant</li> <li>Contaminates comb</li> <li>Does not affect Varroa under capped brood</li> </ul>
<b>Checkmite (Coumaphos)</b>	<ul style="list-style-type: none"> <li>Varroa kill over full treatment cycle of 42 – 45 days</li> </ul>	<ul style="list-style-type: none"> <li>Require special handling and disposal</li> <li>Effective for Small Hive Beetle</li> </ul>
<b>Amitraz (Apivar) (horse tick medicine)</b>	<ul style="list-style-type: none"> <li>No significant residue in wax or honey</li> <li>One application as needed</li> </ul>	<ul style="list-style-type: none"> <li>Varroa resistant</li> <li>Does not kill Varroa behind capped cells</li> </ul>
<b>Control Method: New</b>	<b>Pros</b>	<b>Cons</b>
<b>Oxalic Acid (wood bleach)</b>	<ul style="list-style-type: none"> <li>Inexpensive (\$.50 vs. \$12/hive)</li> <li>Effective</li> <li>No resistance</li> <li>Can be used on swarms and packages (broodless)</li> <li>Drip application safe method</li> <li>EPA and Oregon approved 5/15</li> </ul>	<ul style="list-style-type: none"> <li>Only affects phoretic mites</li> <li>Must be applied during a broodless period (winter)</li> <li>Vaporizer method can be dangerous to beekeeper (must use respirator and gloves)</li> </ul>
<b>Control Method: Do not treat "James Bond Method"</b>	<b>Pros</b>	<b>Cons</b>
	<ul style="list-style-type: none"> <li>Inexpensive</li> <li>Not labor intensive</li> </ul>	<ul style="list-style-type: none"> <li>Very likely will lose colony</li> </ul>



## Varroa Mite Control Methods

Control Method: IPM	Pros	Cons
<b>Drone Brood management</b>	<ul style="list-style-type: none"> <li>Eliminates Varroa mites before they can reproduce</li> </ul>	<ul style="list-style-type: none"> <li>Very labor intensive, disruptive</li> <li>Only removes Varroa under capped brood</li> <li>May affect DCA</li> </ul>
<b>Powdered Sugar</b>	<ul style="list-style-type: none"> <li>Completely organic</li> <li>Quick mite knock down</li> <li>Good treatment for swarms (no brood)</li> </ul>	<ul style="list-style-type: none"> <li>Very labor intensive</li> <li>Must follow application schedule every 3 days for 21 days total</li> </ul>
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<b>Swarming allowed/cage queen</b>	<ul style="list-style-type: none"> <li>Breaks brood cycle</li> </ul>	<ul style="list-style-type: none"> <li>Not good for neighbor relations</li> <li>Seriously impacts hive population</li> </ul>

- Varroa mites naturally fall through the hive
- With a screen bottom board those falling mites fall right out of the hive; more difficult to get back in
- Everyone should have a screen bottom board as they have other benefits



Control Method: Soft Chemicals	Pros	Cons
<b>Thymol (essential oil)</b> <ul style="list-style-type: none"> <li>• Api-Life-Var</li> <li>• Apiguard</li> </ul>	<ul style="list-style-type: none"> <li>• Naturally occurring organic chemical</li> <li>• Mites have not built up resistance</li> <li>• Quick mite knock down</li> </ul>	<ul style="list-style-type: none"> <li>• Very aromatic</li> <li>• Can not use with honey supers in place</li> <li>• Requires blocking screened bottom board</li> <li>• Only affects phoretic mites</li> <li>• Temperature dependent</li> </ul>
<b>Hop Guard (beta acid)</b>	<ul style="list-style-type: none"> <li>• Organic acid</li> <li>• Can apply when honey supers in place</li> <li>• Quick mite knock down</li> <li>• Varroa have not build up resistance</li> <li>• Easy application</li> <li>• Not temperature dependent above 50 degrees F</li> </ul>	<ul style="list-style-type: none"> <li>• Only kills phoretic mites</li> <li>• Short term solution</li> <li>• Unlikely to be used alone for season-long mite control</li> </ul>
<b>Mite Away Quick Strip (MAQS) (formic acid)</b>	<ul style="list-style-type: none"> <li>• Only miticide that kills Varroa in capped brood cells as well as phoretic mites, 7 day treatment</li> <li>• Honey supers can be in place when applied</li> <li>• Naturally occurring organic acid (found in honey)</li> </ul>	<ul style="list-style-type: none"> <li>• Possible affect on egg laying</li> <li>• Requires blocking screened bottom board</li> <li>• Requires minimum 6 frames of bees</li> <li>• Temperature dependent after 93 degrees</li> <li>• Respirator suggested</li> </ul>



- Api Life Var comes as a waffer

- Apiguard comes as a jell in a cup

# Placement of Api Life Var



Control Method: Hard Chemicals	Pros	Cons
Apistan	<ul style="list-style-type: none"> <li>• Varroa kill over full treatment cycle of 42 – 54 days</li> </ul>	<ul style="list-style-type: none"> <li>• Varroa resistant</li> <li>• Contaminates comb</li> <li>• Does not affect Varroa under capped brood</li> </ul>
Checkmite (Coumaphos)	<ul style="list-style-type: none"> <li>• Varroa kill over full treatment cycle of 42 – 45 days</li> </ul>	<ul style="list-style-type: none"> <li>• Require special handling and disposal</li> <li>• Effective for Small Hive Beetle</li> </ul>
Apivar (Amitraz) (horse tick medicine)	<ul style="list-style-type: none"> <li>• No significant residue in wax or honey One application as needed</li> </ul>	<ul style="list-style-type: none"> <li>• Signs Varroa mites developing resistance</li> <li>• Does not kill Varroa behind capped cells</li> </ul>



- Good product to use in August, when temperatures can be high, because it is not temperature dependent
- Only one treatment needed



Control Method: New	Pros	Cons
Oxalic Acid (wood bleach)	<ul style="list-style-type: none"> <li>• Inexpensive (\$.50 vs. \$12/hive)</li> <li>• Effective</li> <li>• No resistance</li> <li>• Can be used on swarms and packages (broodless)</li> <li>• Drip application safe method</li> <li>• EPA and Oregon approved 5/15</li> </ul>	<ul style="list-style-type: none"> <li>• Only affects phoretic mites</li> <li>• Must be applied during a broodless period (winter)</li> <li>• Vaporizer method can be dangerous to beekeeper (must use respirator and gloves)</li> </ul>



- Same ingredient as wood bleach
- Available from Brushy Mountain priced at 35 grams \$5.95
- Only to be used when no brood present
- One treatment only
- Dribble method safer than vaporizing

Control Method: Do not treat	Pros	Cons
"James Bond Method"	<ul style="list-style-type: none"> <li>• Inexpensive</li> <li>• Easy</li> </ul>	<ul style="list-style-type: none"> <li>• Very likely will lose colony</li> <li>• Create a Varroa bomb</li> </ul>
Let the bees swarm	<ul style="list-style-type: none"> <li>• No chemicals involved</li> <li>• Easy</li> <li>• Breaks the Varroa life cycle</li> </ul>	<ul style="list-style-type: none"> <li>• Not good for good neighbor relations</li> <li>• Can lead to beekeeping restrictions within city limits</li> <li>• Inefficient (60% of the mite are still in parent hive)</li> </ul>

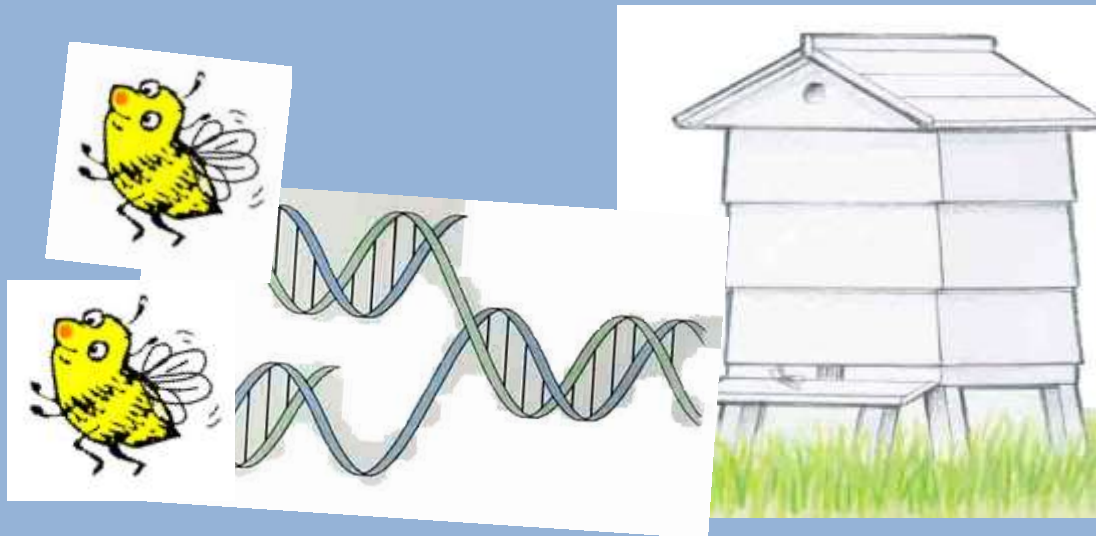
Miticides in my hives!  
Are you serious?



# “James Bond” Method



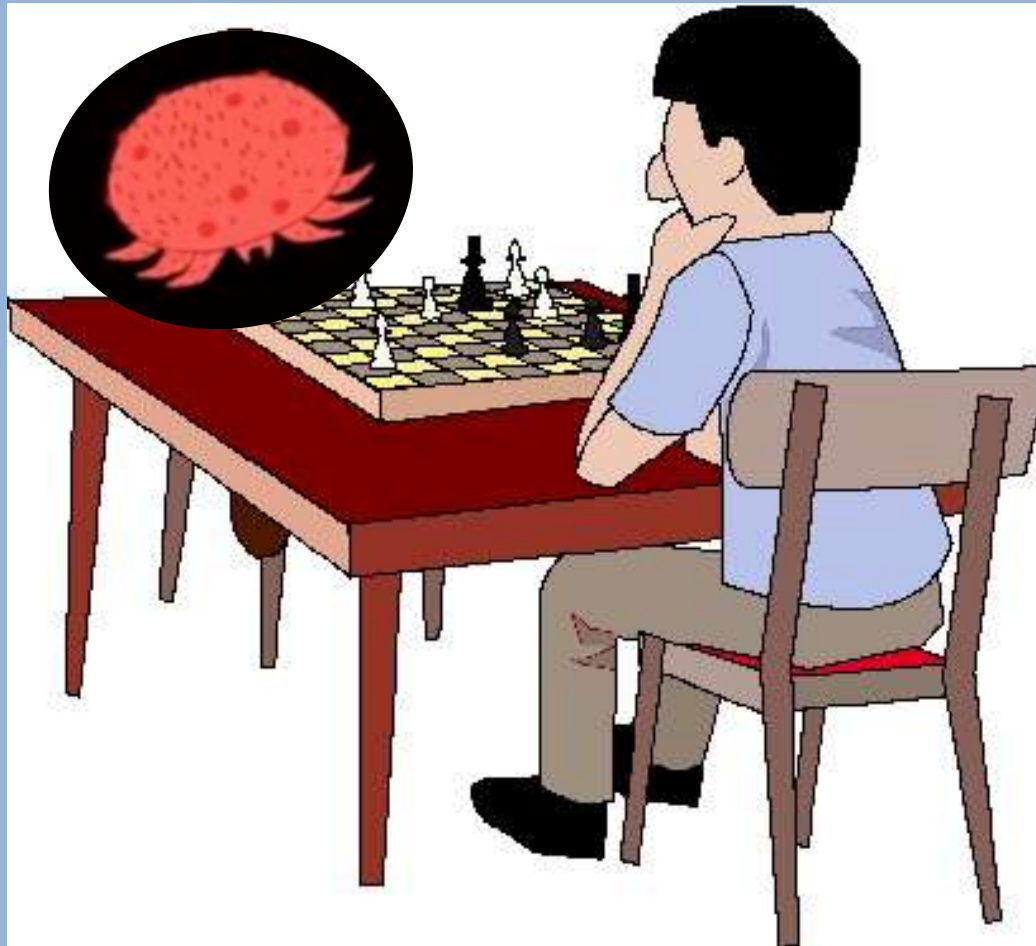
Control Method: None	Pros	Cons
Ultimate Goal: 50+% Hygienic Bees	<ul style="list-style-type: none"><li>• Chemical free beekeeping</li></ul>	<ul style="list-style-type: none"><li>• Not there yet</li></ul>
	<ul style="list-style-type: none"><li>• Colony can successfully co-exist with mites</li></ul>	



## Healthier Bees Through Better Genetics



# Varroa Control Strategies



# 2016

## Opportunities to Control Varroa in an Established Colony

### January

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

### May

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

### September

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

### February

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

### June

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

### October

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

### March

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

### July

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

### November

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

### April

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

### August

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

### December

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## Suggested Treatment Strategy Calendar

### March

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

- Population of Varroa mites is quite small
- By treating them now you have an opportunity to keep the population small
- Suggested medication: Thymol based miticides can be used now because the temperatures are not too warm

What do you do when your  
mite numbers are too high and  
you have honey supers in  
place?



## Suggested Treatment Strategy Calendar

### June

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

- High mite count during nectar flow
- Can treat with supers in place if use MAQ's

# Start your treatment by August 1st

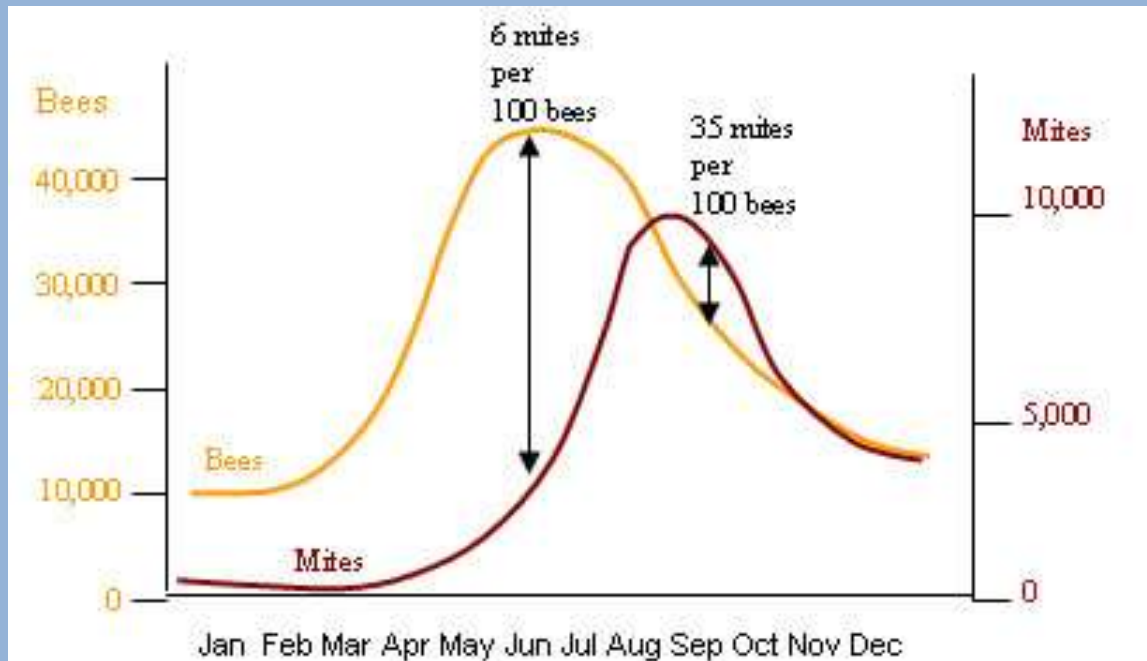


Figure 1. Simplified bee and mite population growth curves for a temperate climate. The mite growth curve lags behind the bee curve. Note how the number of mites per hundred bees greatly increases in fall. A colony is unlikely to survive a fall infestation rate this high.

## Suggested Treatment Strategy Calendar

### August

Su	Mo	Tu	We	Th	Fr	Sa
	①	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

- Start treatment by August 1st
- Mite population must be reduced as the colony is preparing to raise winter (fat) bees
- Suggested medication: Apivar
- Thymol based products not recommended due to possible high temperatures

The difference between ignoring the August deadline and not...



No fat winter bees



# Winter Opportunity



## Suggested Treatment Strategy Calendar

### December

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

- Little or no brood is present at this time so mites are all phoretic
- Last opportunity to knock mite population down to acceptable levels
- Suggested medication:  
Oxalic acid

There is an opportunity to get rid of phoretic mites anytime there is no capped brood: swarms and packages



## Suggested Treatment Strategy Calendar for swarms and packages

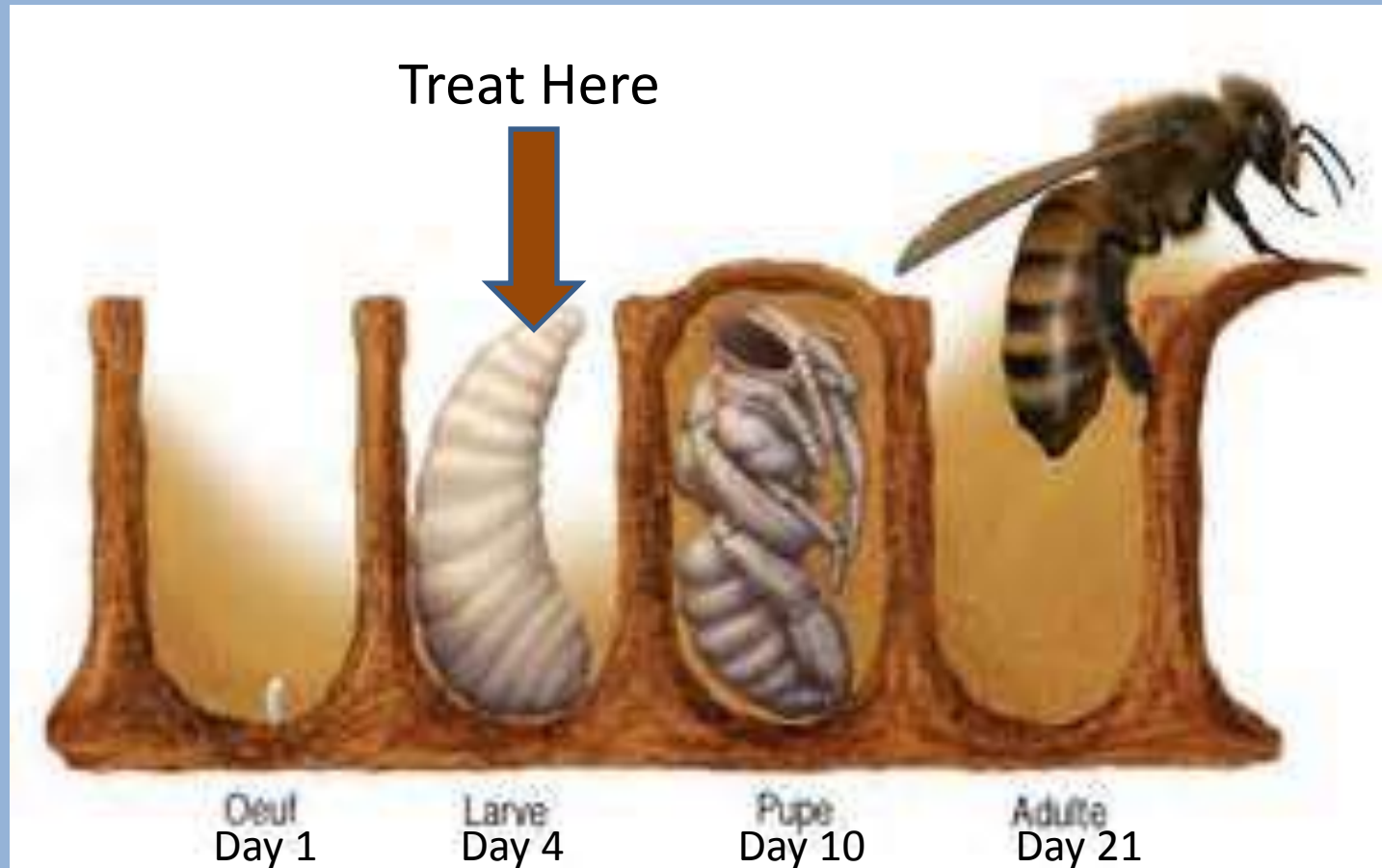
### April

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

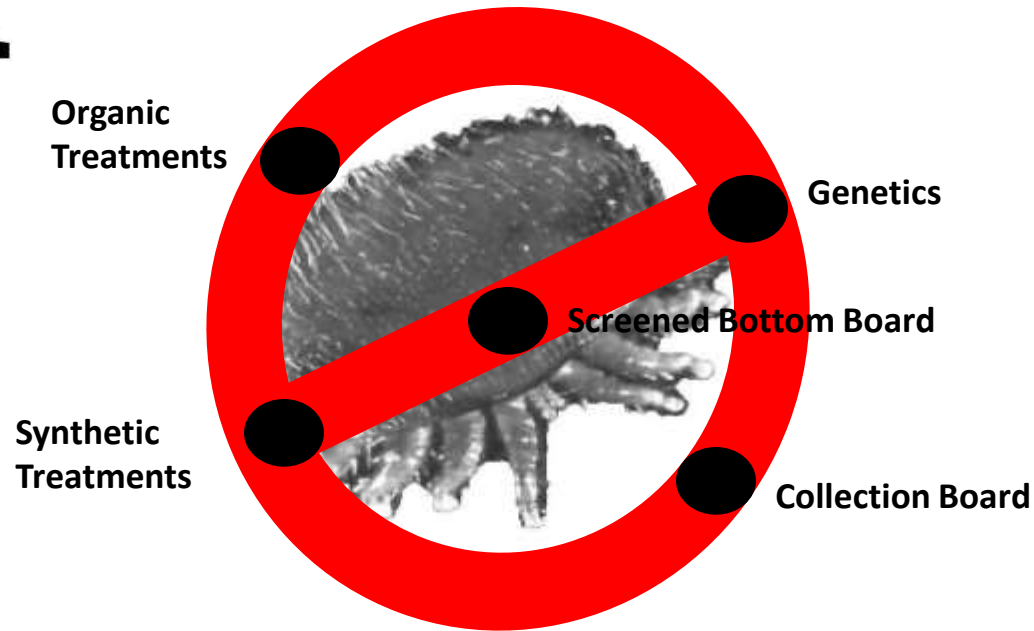
- April is when swarms start
- Since there is no brood in a swarm, virtually all the mites are phoretic
- Suggested medication: Just about any of the mite control methods are appropriate now



Remember to treat before the first brood is about to be capped (by day 8)



# Rx



**Be Proactive: Control Varroa**

# Don't Give Varroa a License to Kill!



**OREGON**

Class  
K

**License to Kill**

00753276

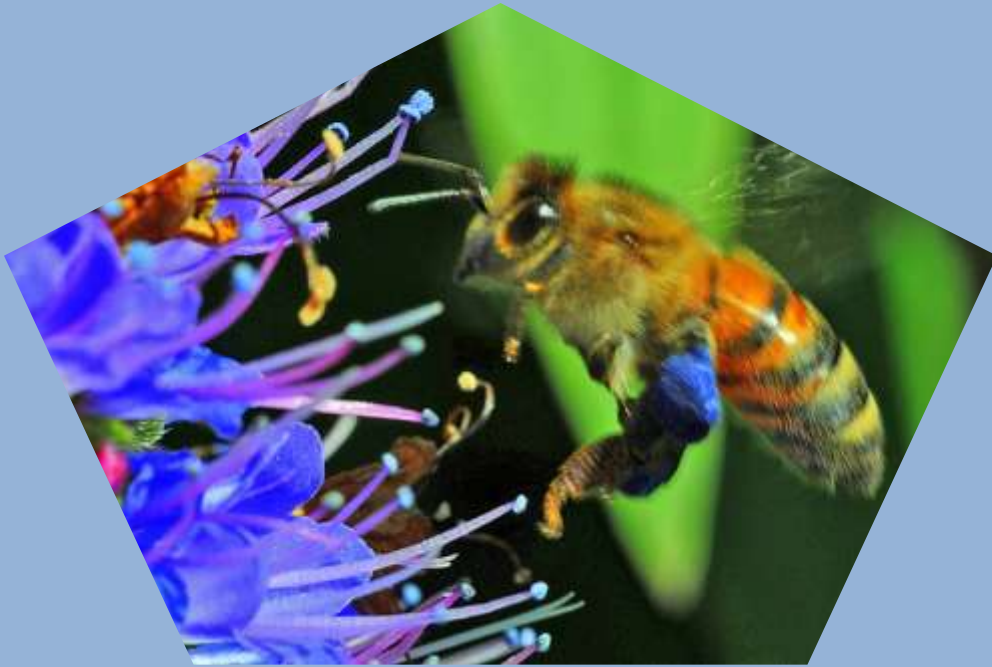
Expires NOW

**Varroa destructor**  
**Your Bee Hive**  
**Any Place, USA**

Restrictions  
**Untreated Hives**



# Why is this important?



If you are going to  
keep bees, keep  
them responsibly

# The End



Photo: Suzanne Jurgens



# Questions?



(c) Kathy Keatley Garvey