Diseases and pests of honey bees

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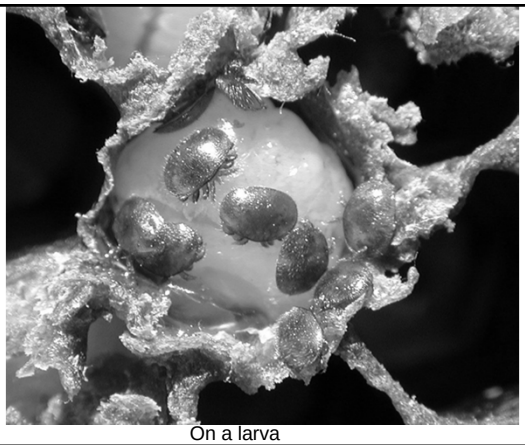
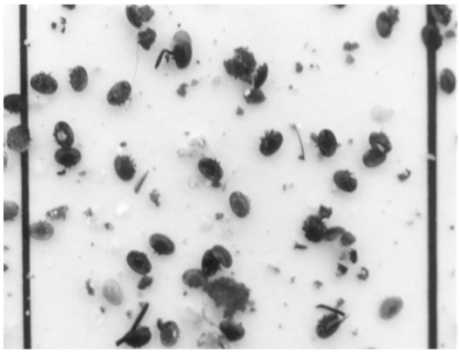
1. Varroa mite
2. American foulbrood
3. *Nosema ceranae*
4. Small hive beetle
5. Tracheal mite
6. Wax moth
7. Chalkbrood
8. European foulbrood
9. Bears, skunks, etc

Varroa mite (*Varroa destructor*)
(formerly *Varroa jacobsoni*)



On a larva



On bottom board (white paper)

Bee Viruses
(most of them transmitted by *Varroa*)

DWV: deformed-wing virus

KBV: Kashmir bee virus

BQCV: Black queen cell virus

CWV: cloudy winged virus

APV: Acute paralysis virus

SPV: Slow paralysis virus

1. Apistan:

Section 3 (general registration nationally)
Fluvalinate (a pyrethroid)
Attacks sodium channel
Not as toxic to mammals (due to differences in Na+ channel)

Most mites are now resistant

2. Checkmite+:

An organophosphate
Attacks the central nervous system
(acetyl-cholinesterase inhibitor)
Toxic to mammals (same target site)

Mites are becoming resistant

3. ApiLife Var

Made by Laif Company, Italy.
Available from Brushy Mountain

Thymol and menthol, camphor, eucalyptol
70-95% efficient (most of the time near 70%) against Varroa
Also effective against tracheal mite
Temperature dependent

Taste threshold for thymol is 2 ppm
residue in honey was 0.1 ppm in one study

4 . Apiguard

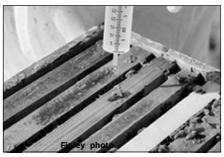
Very similar to ApiLife Var

Around 70% efficiency against Varroa

5. Formic acid: Miteaway (www.miteaway.com)

6. Oxalic acid: Trickling Method

- Make up a sugar syrup consisting of 1 kg sugar in 1 L of water (50%). Add 75 gm of oxalic acid dihydrate and mix well.
- Trickled between 2 frames end to end OR on the frame top bars (if the weather is too cold).
- REPEATED for each frame containing bees. A 10-frame deep full of bees will require 50*mL* (about 10 tsp.). Best if broodless
- Dose: 5 *mL per* frame space
  - 50 *mL* for 10 frames
  - Adjust dose proportionally (e.g. shallows = half dose).
- Must be repeated 3 times, 7-10 days apart



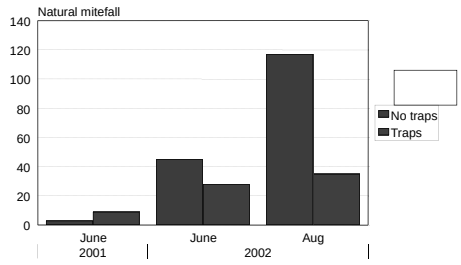
Slide courtesy of D. Sammataro

Applying OA

- **Use a 60mL syringe**
- **Note Acid gloves**

7. Using screen bottom board

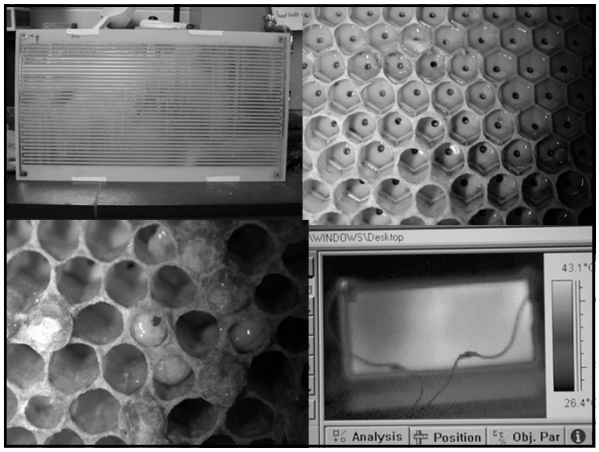
Effect of traps on mite infestation



Data from T. Webster

8. Using Drone-Trapping to reduce mites

1. Drone trapping method (works, labor-intensive, ~60%)\
2. Mitezapper

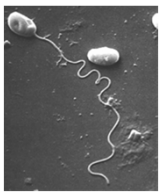


9. Stock

1. Use resistant bee when possible: VSH, Hygienic, Russian
2. Breed your own bees from survivors

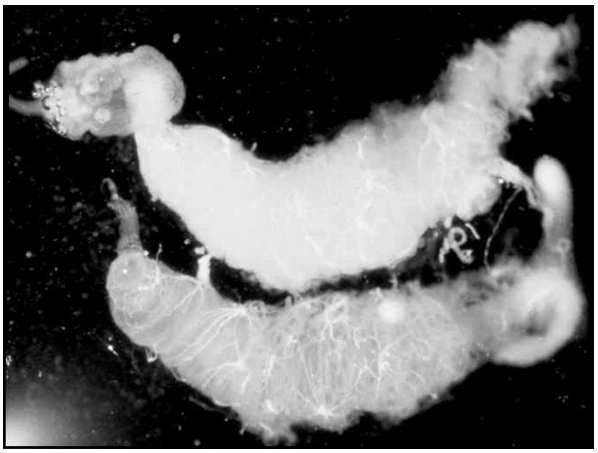
    1.Queen rearing
    2.Hygienic assay
    3.Drone stock
    4.Control of mating

Life cycle of Nosema apis

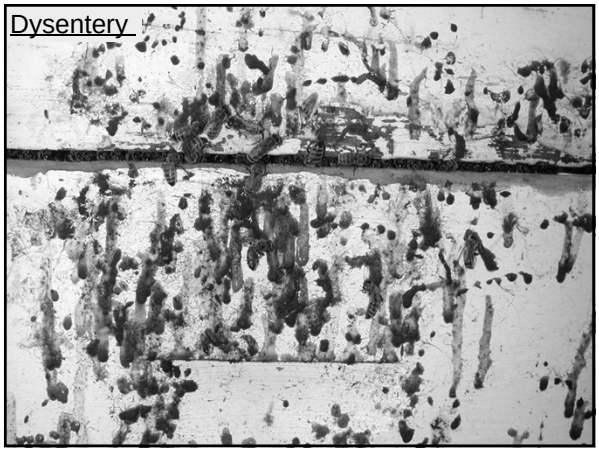


- Transmitted by spores
- Spore ingested by bees
- Long, coiled, polar filament everts
- Sporoplasm injected into host cell
- Multiply through vegetative stages
- Spores released when host cells burst
- Spores voided and re-infect other bees or re-infect other midgut cells

Photo: http://www.biol.lu.se/cellorgbiol/microsporidia/proj_descr.html

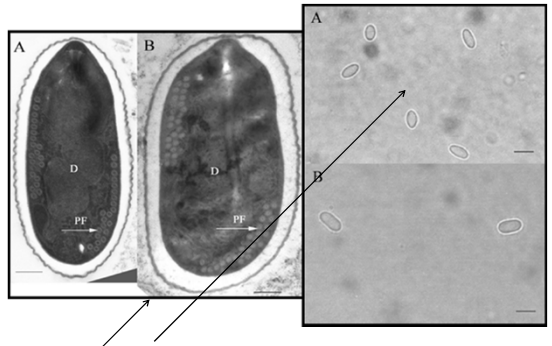


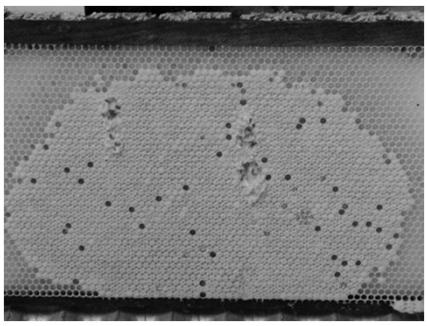
Dysentery



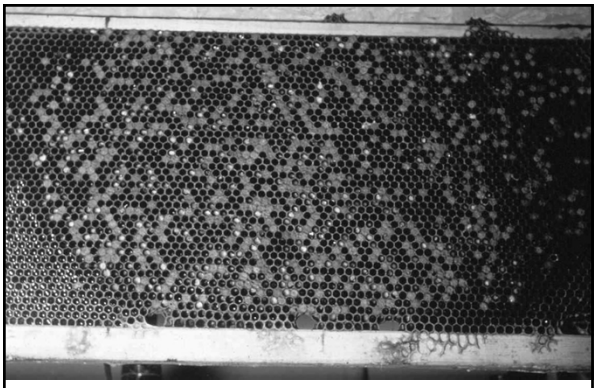
New twist on Nosema

1. The original species was Nosema apis
2. A new species was discovered in 1996 by Ingma Fries, in *Apis cerana*, named *Nosema ceranae*
3. In 2005 it was reported in Western bees (*Apis mellifera*) in Taiwan and Europe
4. Now it seems all the nosema we can found in US is also *Nosema ceranae*.
5. Recent studies in Spain attribute 50% of colony loss to N. ceranae.

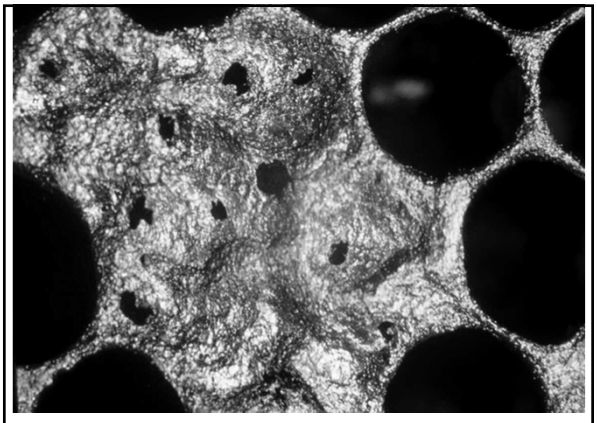




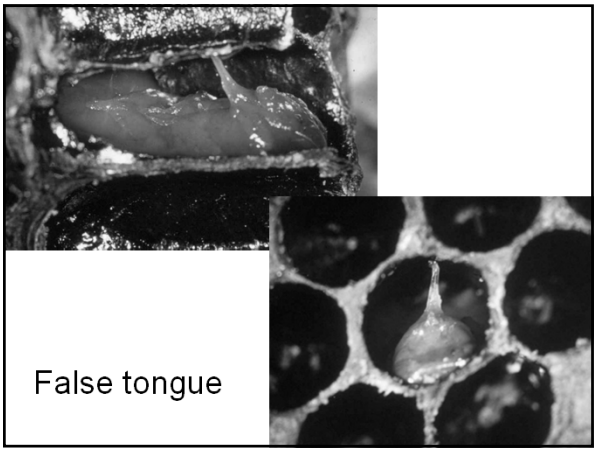
Healthy brood frame



Unhealthy brood pattern



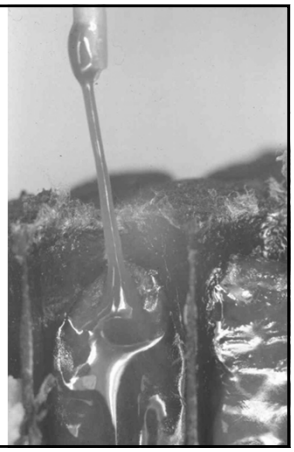
Punctured Cappings, Cheesy Smell



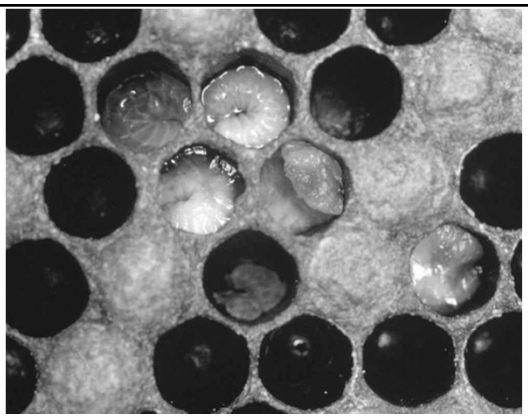
False tongue

1. Sunken caps
2. Holey caps
3. Smell
4. False tongue
5. Ropiness test

American foulbrood
Paenibacilus larve



Control?



European foulbrood (Melissococcus pluton)

Treatment 2

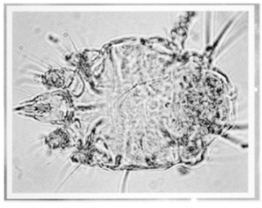
Most bacteria now resistant to Terramycin

New drug: Tylan (Tylosine)

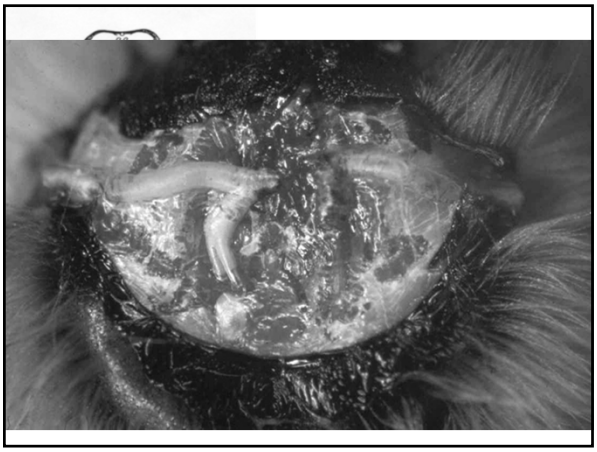
Do not use patties: use dust instead.

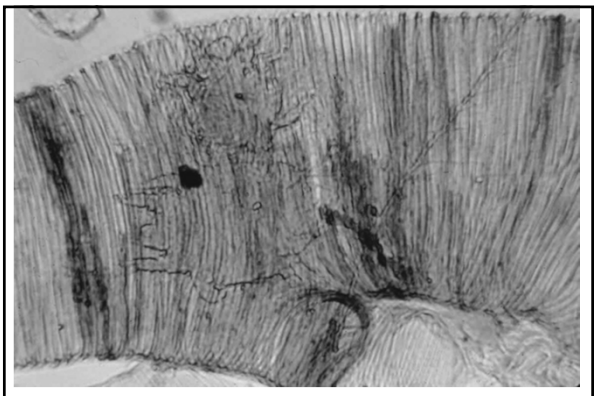
Do not treat prophylactically

WEAK COLONIES, CRAWLING OR JUMPING BEES



TRACHEAL MITE - ACARAPIS WOODIE, 0.15mm

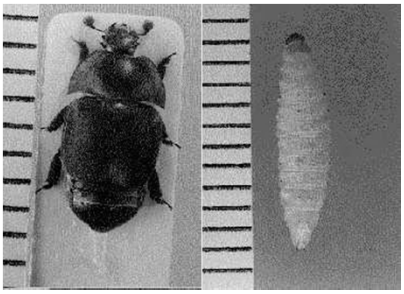




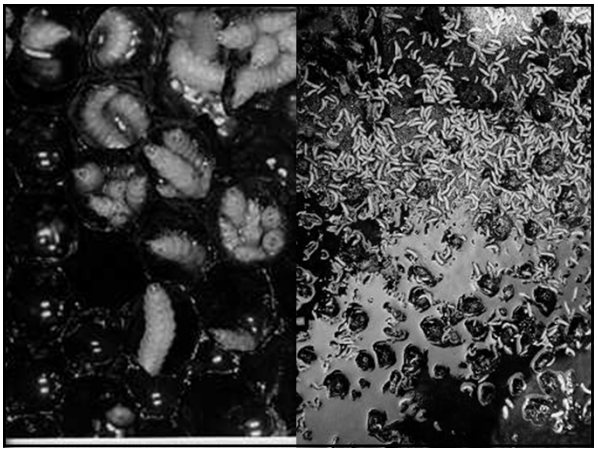
Blocked and damaged trachea

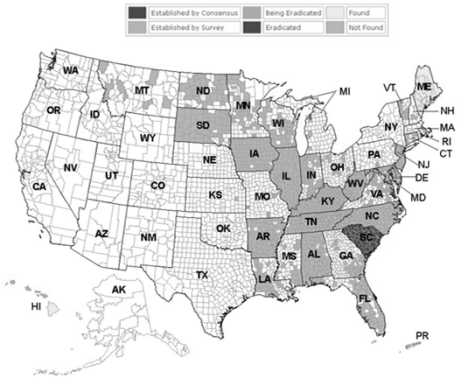
Treatment

Grease patties,
Formic acid,
Apiguard/ApiLife Var
Menthol crystals



Small hive beetle, *Aethina tumida* (Nitidulidae)





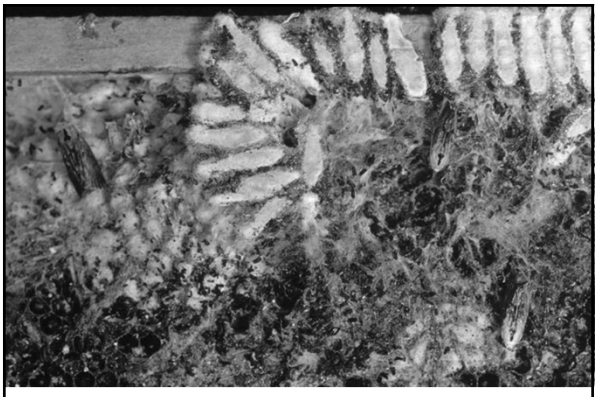
Treatment

Checkmite+ (coumaphos)
+ corrugated cardboard
GardStar (40% permethrin)
Soil drenching

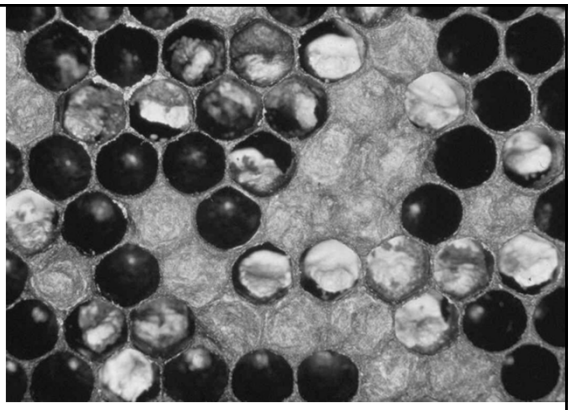
Wax moths

Galleria mellonella
(Greater wax moth)

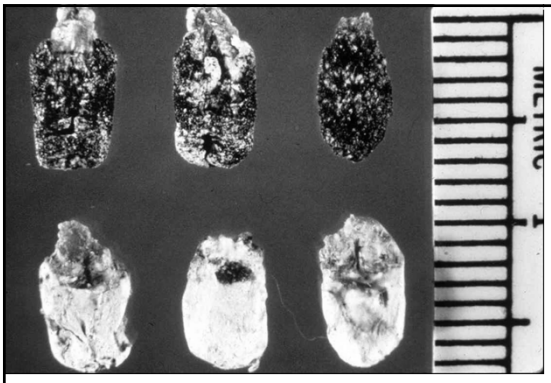
Achroia grisella
(Lesser wax moth)



Freezing, strong colonies, ParaDichloroBenzene



Chalkbrood (Ascosphaera apis)



Chalkbrood mummies
(Ascosphaera apis)

Predators

Bear

Skunk, badger, raccoon

Mice, rats

Birds, hornets

“Colorado river toad”

Control

Varroa mites: formic acid. Apiguard/ApiLife Var, Drone brood trapping, mitezapper

Nosema: better location, feeding fumidil-b

AFB: burning, tylosin, torching, shaking

Small hive beetle: Coumaphos, GardStar

Chalkbrood: feeding, requeening, cleaning

Tracheal mites: grease patties, formic acid, Menthol

PREVENTION

Good pollen & nectar supply (location!)

Strong colonies

Young queen bees

Careful while feeding colonies

Careful with swarms & new colonies

Routine cleaning of hive material & tools

Routine replacement of “old” combs

BEE INSPECTION:

MICHEAL G. HANSEN

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