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# Pests & Disease

Biggest pest to smallest

bear > skunk > mice > moth > beetle > mites

(often involves physical damage)

Diseases are caused by bacteria or fungus or viruses  
(involves metabolic damage)

Much of the material in this presentation is derived  
from the booklet “Honey Bee Diseases and Pests” by  
Dr. Marla Spivak and Gary Reuter  
University of Minnesota  
2008

- Consider a using as few chemical treatments as possible.
- Use resistant bees – “Ability of a strain to tolerate or avoid factors that would prove lethal or degrading to the majority of other strains.” Bees that can live with, or defend against mites and disease longer than sister strains.
- But remember that pests become resistant too

- Use hygienic or “cleaning” bees.
- Use IPM and treat only at economic threshold
- Varro mites are likely to be the only problem you face – (ask the panel what their problems are)
- “A responsibility of every beekeeper, and one of principles of productive beekeeping, is to keep all colonies in a ‘disease free’ condition”
- Because of honey robbing, expect your hive to be exposed to bees that carry baggage
- Bees should be strong and able to survive without us

# Pests - Mammals

- Bears: In bear-prone areas, use electric fencing (with a solar charger) to prevent access. Once bears taste honey, they are almost unstoppable.
- Skunks: They scratch the hive to get guard bees to come out – then they eat them. Hives harassed by skunks have tendencies to be ornery. Hives can be weakened by skunk raids. Discourage skunks with low electric fencing or carpet nail strips on the hive bottom board.
- Mice: Mice like to be warm and move into stored hives and out-wintered hives. They eat pollen, honey, and dead bees and they wreck combs and frames when they build nests. Use an entrance reducer to keep them out. Seal cracks in hive boxes, close bottoms of store hives.

# Pests – Wax Moths

- Adult moths lay eggs in cracks of weak hives and stored equipment. The larvae that hatch eat and tunnel through wax combs. They leave crap and silk material in their wake.
- If you keep hives strong, the bees will prevent use propolis to seal cracks and keep larvae out.
- Clean up loose wax from bottom boards and stored equipment.
- Use mothballs when storing supers. Seal supers in plastic bags.



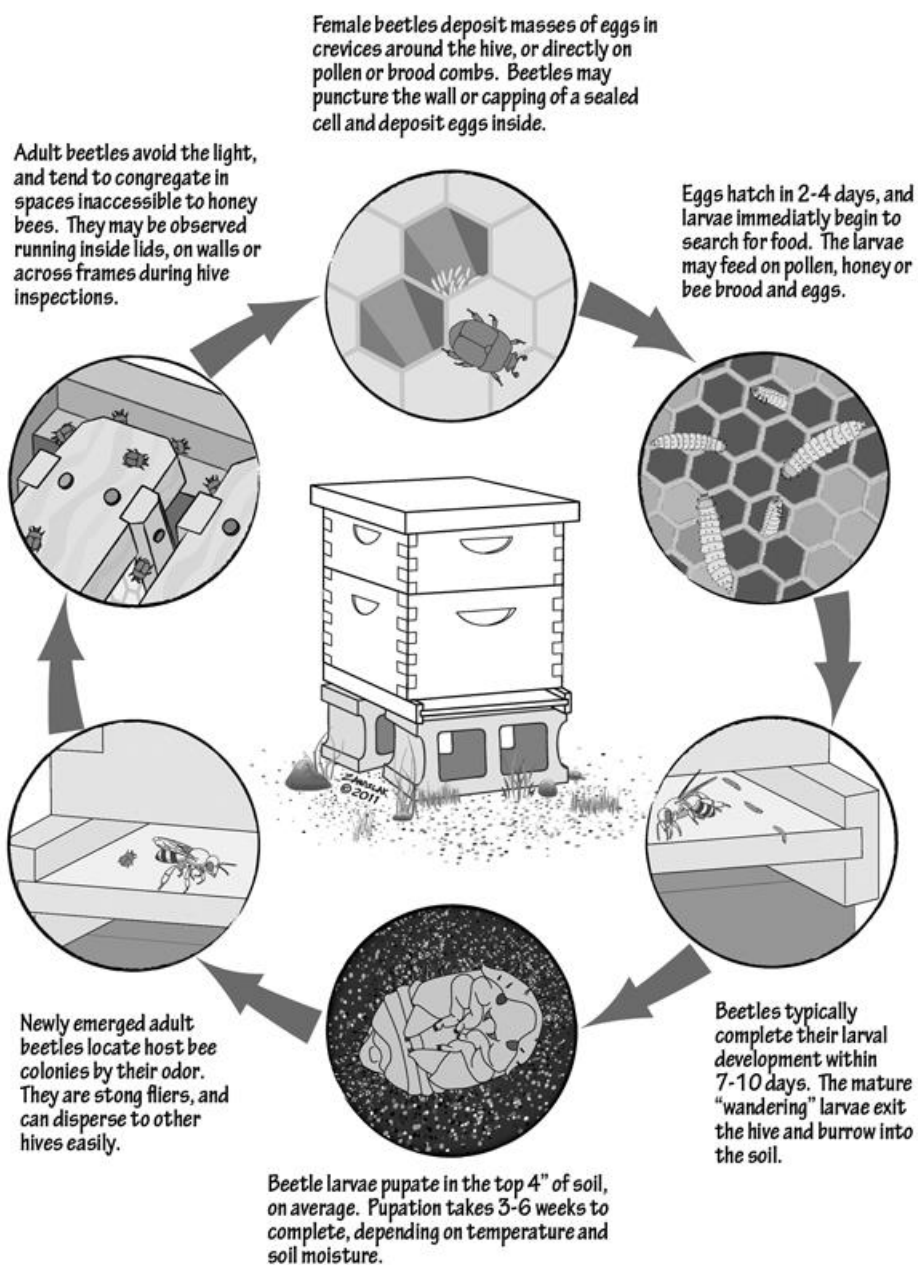
# Pest of the EAST WI Technical College beetle

(from E-extension)

- Not widespread in northern states.
- Prevention & control:

Prevent weak hives from contaminating other hives.

Treat the ground beneath infested hives.





# Pest/disease -Mites

Two kinds: **Tracheal** and Varro

- Tracheal mites reproduce inside the bee's tracheal tubes
- They feed on blood
- High infestations are, of course, damaging
- No outward symptoms
- Pile of dead bees with lots of honey still in the combs may be the only sign
- You can autopsy them under a microscope
- Use resistant queens, build up natural resistance
- Do not treat unless you are sure of diagnosis - menthol

# Pest/disease -Mites

Two kinds: Tracheal and Varro

- They feed on blood of adults and immature stage bees
- They are visible to the naked eye
- They crawl into cells of older brood just before it is capped
- They are sealed in the cells and lay mite eggs.
- One mite “baby” is male, the rest are female. They mate and mites emerge when the bee emerges.
- Mites prefer drone brood – longer time for mites to “get busy”
- Emergent Bees are deformed, weakened and have shorter lives
- Mites may transmit viruses – similar to Ticks & Lyme’s disease
- Use “resistant” bees – they succumb at higher mite levels

- Become familiar with the powdered sugar sampling method.
- Consider the sticky board counting method where more than 60 mites in 24 hrs is high
- Ask experienced keepers if they routinely treat or wait until they detect “economic threshold” levels
- Consider screened bottom boards – mites drop through
- Consider removing drone comb

## Other Treatment options

Thymol (oil from Thyme)

- ApiLife Var<sup>®</sup> = thymol + menthol, eucalyptol, camphor
- Apiguard<sup>®</sup> = thymol in a slow release gel
- Both need awareness of air temperature because they volatilize (60-70 degrees ApiLife or 60-80 degrees Apiguard)
- Formic Acid (Mite-Away II<sup>®</sup>) – corrosive, needs special equipment
- Apistan<sup>®</sup> and CheckMite<sup>®</sup> not recommended
- Most treatments are incompatible with honey.

# Diseases

## Brood

- American Foulbrood
- European Foulbrood
- Chalkbrood

## Adult bees

- Nosema



# Brood diseases

## American Foul brood

- Most widespread & damaging of the 3 brood diseases
- Caused by a bacteria...which infects bee larvae
- Bee larvae die after being capped in the comb
- They turn brown, gooey, icky before drying to a brown scale at the bottom of their comb cell. FOUL!
- Is spread by re-using infected combs
- Inspect used combs/hives before buying
- Use hygienic queens – (more on this coming up)
- Burn frames, scorch everything else – maybe bees too
- Antibiotics will not kill the bacterial spores.



# Brood diseases

## European Foul brood

- Rarely kills the colony
- Appears in “stressed” colonies
- Caused by a bacteria
- The bee larvae typically die before they are capped and therefore workers can remove them.
- Hygienic bees are not resistant to this disease
- As a last resort, use antibiotics – Terramycin
- It is important to stop any antibiotics at least 30 days before any honey harvest!



# Brood diseases

## Chalkbrood

- Rarely kills the colony
- Appears in “stressed” colonies
- Caused by a fungus
- The bee larvae become mummies under capped cells.
- Hygienic bees have good “resistance” to this disease
- Spread by re-use of infected combs & frames
- No chemical/antibiotics treatment is available

# Adult bee diseases

## Nosema

- Can cause colony death, especially in winter
- Caused by a single celled microsporidian
- It lives in the bee's stomach
- It is spread through the bees feces
- There are no external symptoms
- Control by replacing old combs regularly
- Use Fumagilin-B<sup>®</sup>

# Colony Collapse Disorder

- Worker bees simply abandon the hive
- They leave behind the queen, brood, pollen, honey
- Bees are not laying there dead, they are gone

- In 1946 there were 5.8 million honeybee colonies spread all over the U.S. in small apiaries
- Today there are 2.5 million colonies concentrated in commercial apiaries.
- FEEDLOT BEEKEEPING
- Dairy – today Wisconsin has just 9,400 dairy farms compared with 60,000 farms in the 1950s.
- Cows are concentrating too .....
- Are there parallel lessons coming?

- Colony collapse was first noticed in 2006
- $\frac{3}{4}$  of all commercial beekeeper have quit in the last 15 years
- 100 million hives lost since 2006

# What triggers colony collapse?

- Varro mites ? (first introduced in about 1980s)
- Poor nutrition ( sugar water instead of honey?)
- Poor nutrition (GMO soy protein patties with built in insecticides?)
- Climate change?
- A new fungus or virus?
- Pesticides?

- “seem to affect bees and other insects at levels that should be safe”
- Dr. Porter
- - Multiple exposures  $1+1+1 = 5$
- 1200 registered pesticides are used in the U.S.
- Neo-nicotinoids – (imidacloprid)an insecticide coating the seeds of corn, dust at the edge of the field similar in size to pollen grains

# Bees are complex; a system, a hive, a community

- Yet we treat them as very simple commodities.
- Bees have a normal gut flora, just like us
- What happens when we feed them sugar derived from high fructose corn syrup made from GMO corn?
- Alex Lu professor of environmental exposure biology @ Harvard fed hives the HFCS for 23 weeks.
- At 12 weeks all hives were alive
- At 23 weeks 15/16 hives were dead

- Don't panic
- Pests and diseases are manageable
- You will learn symptoms, techniques and treatments with more experience
- Attend the beekeepers association meetings to continue learning and to network with experienced keepers