

Disease Management




Presented by Lance Wilson  
 Certified Master Beekeeper  
 University of Georgia/Young Harris




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### The prime directive

Maximize the size the adult population

WHY?

1. Protects against robbing
2. Prevents SHB and wax moth infestations
3. Prevents disease expression
4. Helps insure winter survival
5. Increase honey yield




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### The Four Golden Rules of Beekeeping

1. Manage Nutrition
2. Regular Requeening
3. Comb Rotation
4. Pest and Disease Control




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## Honey Bee development



Egg for 3 days



Larva for 6 days



Pupa for 12 days



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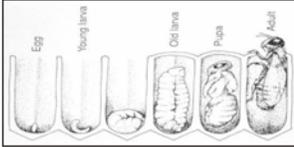
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## Honey Bee Development





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## What does healthy brood look like?

Healthy Larvae



Healthy Capped Brood





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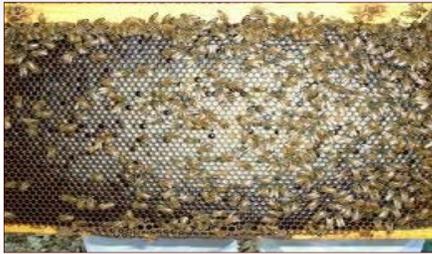
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### Open Brood Frame



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### American FoulBrood (AFB)



**Agent:**  
Bacterium . Identified G.F.White  
1906

- Symptoms:**
- > Perforated and sunken
  - > Die upright in cell
  - > Coffee colored decay
  - > Black scale

- Impact:**
- > Infectivity enormous
  - > Disease expression will continue until colony crashes.



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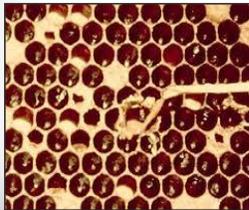
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### American foulbrood Field Identification

Ropiness Test

Scales



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## American Foulbrood field Identification

Pupal Tongue



Test Kit



**ATM**  
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## American foulbrood Life cycle



- Spore is fed to 1-2 day old larvae
- Germinates in the midgut
- Ruptures stomach
- Dead pupa putrefies forming a coffee colored mass
- Distills to a black scale in the bottom

**ATM**  
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## American FoulBrood

- Treatment:
- Isolate colony immediately if possible.
- Slight infection-remove frames and burn
- If infection returns -shook swarm method into new equipment burn frames and scorch boxes.
- If infection returns- burn



**ATM**  
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## American Foulbrood

Labeled: Oxytetracycline and Tylan

- Resistance
- Only suppresses the vegetative state
- Slows the natural evolution to become genetically resistant
- Can contaminate honey
- Kills beneficial bacteria



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## American Foulbrood Prevention

- Feed during dearths boosts immunocompetence
- Practice good hygiene
- Use genetically resistant queens
- Be able to identify symptoms and take action asap
- Do not feed outside honey



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## European foulbrood (EFB)



Agent: Bacterium.  
Identified G.F White  
1906

- Symptoms
- Kills larvae before capping 5th instar
  - Darkened-displaced
  - Bad odor
  - White trachea displayed
  - No Scale
  - No ropiness
  - Symptoms can be variable

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## European Foulbrood symptoms

Single cell



Larvae comparison



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## European Foulbrood life History

- Bacteria is fed to young larvae
- The pathogen multiplies in the stomach
- Larvae die in days **before capping**
- EFB has **no spore stage**



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## European Foulbrood Impact

- Can cause significant loss of brood but rarely crashes colony
- Can lower honey production
- Can spread to other colonies through robbing-drifting
- Will often disappear on its own.



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## European Foulbrood Treatment

- Maintain strong colonies
- Feed to stimulate cleaning and boost immunocompetence
- Reduce stress
- Burn infected frames
- Requeen so you get genetic resistance and break brood cycle



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## Chalkbrood

**Agent:** Fungus discovered in the U.S. in 1968

**Symptoms:**

- Cell fill with mycelium and harden to mummies
- Heart shaped pattern in the mycelium
- Mummies are white or grey depending on stain
- You may find removed mummies



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## Chalkbrood Causes and impact

- Chalkbrood spores exist in bee bread
- Is a stress disease and will usually clear up by itself during first nectar flow
- Early chill in spring around periphery of brood area
- Prevalence- 1 in a hundred colonies, can hit a particular region



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## Chalkbrood Treatment

- No chemical treatments are available
- Keep strong colonies- since they are better able to thermoregulate
- Feed - Stimulates cell cleaning and boosts resistance
- Add brood and bees
- Increase ventilation. Move hives if they are in a low lying or damp area. Increase sun exposure or employ a screened bottom board
- Requeen
- Combs containing a lot of infections should be burned



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## SACBROOD

**Agent:** Virus

**Symptoms:**

- Some capped over some not
- Kills in prepupal elongated stage
- Watery sack filled with huge viral load
- Canoe shaped with darkened head
- Adults are asymptomatic but reduces longevity



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## Sacbrood impact and treatment

- Will typically clear up on its own
- No chemical treatment
- Requeen
- Feed
- Maintain a strong colony



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## Parasitic Mite syndrome (PMS)

**Agent:** Viruses

**Symptom:**

- Often confused as EFB
- Kill larvae in various stages of development -diagnostic
- Mites are often visible
- Adults with DWV
- Rapid collapse of the adult population
- Very common



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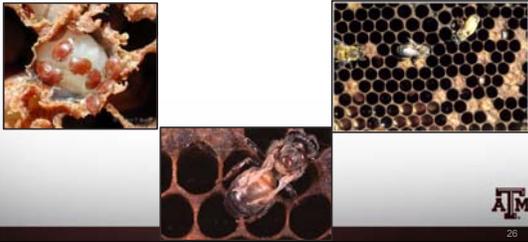
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## Parasitic Mite Syndrome Impact and Control

- No chemical control
- Must control vector the Varroa mite
- Will collapse a colony if Varroa is not managed
- Requeen with Varroa resistance genetics
- Feed to boost cleaning and immunocompetency



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## Hive Pests

- Not pathogens . Organisms that live off the resources of the hive.
- These pests are secondary organisms
- Hive pests are good?
- The primary defense against hive pests is simply a *strong colony*.
- Two largest problem pests-Wax Moths and SHB



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## Wax Moths and SHB are Secondary Only!



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## Greater Wax Moth

**Agent :** *Galleria mellonella* . It was the number one pest for centuries.

Larvae tunnel through brood comb eating wax, brood and pollen.

**Symptoms:**

- Large larvae
- Silk cocoons
- Silk webbing, tunnels with feces
- Adults can be seen flying around the hive a night



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## wax moth Impact

➤ If a colony is allowed to become weak for any reason wax moths can secure a foothold and finish off a collapsing colony.

➤ Stored brood comb must be protected from wax moths or will destroy it.



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## Wax Moth Control

- Strong colonies=Large adult populations so that they don't get a foothold.
- Remove damaged frames and freeze or place on strong colonies
- Reduce patrol area.
- Add frames of bees and brood
- Cull old dark frames

➤ **Frame storage :**

- Paradichlorobenzene (PBD) –Only chemical labeled for comb storage
- Freeze frames and keep in freezer or secured in moth tight garbage bags.
- Place in open air shed with direct sunlight.





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## Small Hive Beetle

**Agent:** Insect *Aethinda tumida*. 1998.

**Life Cycle:**

- An adult beetle will fly into weakened colony
- Egg 3 days, larvae 14 days, pupa 4 weeks but variable








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## Small Hive Beetle Impact

- The adults do not cause any damage
- Larvae will eat honey, pollen and brood-nasty slime
- Abscond threshold- 1000
- Beetle larvae will destroy honey stored waiting for extraction.






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## Small Hive Beetle (SHB) Natural Controls

- Strong Colony
- Discard burr comb
- If you notice larvae take the frames out and freeze them
- Reduce the patrol area
- Add brood and bees to a weak colony
- Use beetle traps to kill adults
- Reduce the hive entrance



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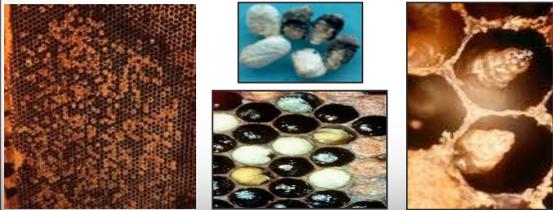
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## The Takeaway

Be able to identify brood disease symptoms so that the correct action can be taken.



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## More Info



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## Questions?

- [lance@beekeepinghelp.com](mailto:lance@beekeepinghelp.com)



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