COMMON PROBLEMS AFFECTING HONEY BEES

- PATHOGENS, PESTS, PARASITES, DISEASES & PREDATORS

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PATHOGENS (Agents of Ills)

Bacteria & Viruses

• Bacteria
  – *Paenibacillus larvae* – American Foulbrood (AFB)
  – *Melissococcus pluton* – European Foulbrood (EFB)

• Viruses
  – Acute Bee Paralysis Virus (ABPV)
  – Israeli Acute Paralysis Virus (IAPV)
  – Kashmir Bee Virus (KBV)
  – Deformed Wing Bee Virus (DWV)
  – Black Queen Cell Virus (BQCV)
  – Chronic Paralysis Virus (CPV)
  – Sacbrood Virus (SBV)

Arthropods, Protozoans & Fungi

• Arthropods
  – *Varroa destructor (jacobsoni)*
  – *Acarapis woodi* – Tracheal mites
  – *Aethina tumida* – Small hive beetle
  – *Galleria Mellonella* (Greater wax moth)
  – *Achroia Grisella* (Lesser wax moth)

• Protozoans
  – *Nosema apis*
  – *Nosema cerana*

• Fungi
  – *Ascophaera apis* – Chalkbrood
  – *Aspergillus: A. fumigatus, A. niger, A. flavus*
  – Stonebrood
PESTS

• Two main pests occur frequently in a beehive.
  – Wax moths
  – Small Hive Beetles (SHB)

• Although they are frequently blamed for the failure of a colony, these two are actually scavengers that take over a weak colony or one that is failing due to other causes, e.g.
  – Failing or missing queen
  – Varroa mite infestation
PESTS Cont’d)

• Wax Moths

  – How to recognize Wax moths:
    • They leave silken threads wherever they go, covering entire frames in days.
    • Typically, wax moths will attack weak colonies or empty supers that are unprotected.

  – How to eliminate wax moths:
    • The only approved out-of-hive chemical treatment is paradichlorobenzene (PBD) crystals.
    • Place them only above empty supers and remove the supers to air out for several weeks before putting back on a hive.
    • NEVER use mothballs - the chemical in moth balls remains in your wax and will transfer to your honey.

  – How to prevent wax moths:
    • Keep empty supers in a dry, well lit with sunlight and well ventilated location.
    • A strong colony will eliminate wax moths on their own; a weak hive is defenseless.
WAX MOTHS

Wax moths are almost always present in a bee hive. However, they are creatures of opportunity and appear in sufficient numbers to wreak havoc only when a colony is weakened due to Varroa or other factors.
PESTS (Cont’d)

• Small Hive Beetle (SHB) - *Aethina tumida*

  – **How to recognize SHB:**
    • Small hive beetle larvae consume everything in the comb. And they defecate everywhere they go. This causes the stored honey to ferment and ooze out of the comb, causing quite a mess.
    • Eventually, the colony may abscond from the hive entirely.

  – **How to eliminate SHB:**
    • The only chemical currently approved for the treatment of SHB is Coumaphos (Check-Mite+ strips).
    • The primary means of control for his pest rests in the use of various forms of traps. Kill any and all SHB that you encounter during routine inspections.

  – **How to prevent SHB:**
    • The beetle is most often found in weak or failing hives and rarely affects strong hives.
    • A strong colony will be able to keep the SHB under control; watch weak colonies.
SMALL HIVE BEETLE

The SHB is a fairly recent pest, introduced to the US from Asia. The only chemical treatment approved to reduce or eliminate this pest is Coumaphos. It can be used in one special trap, the “Beetle Barn.” But numerous other types of non-chemical beetle traps are available to help with the problem.
CHECKMITE+ & BEETLE SWATTER COMBO

The device shown here can contain Checkmite+ strips to poison the SHB and doubles as a swatter to crush them.
PARASITES

• Varroa Mites (*Varroa destructor*)

  – How to recognize Varroa mites:
    • Varroa mites are small reddish/brown colored insects that feed off of the body fluids of adult bees (phoretic mites) as well as larvae.
    • They are visible to the naked eye and are most easily seen on brood (especially drone brood).
    • Varroa does not cause disfigurement directly, instead they are a carrier (vector) for a virus that affects the honey bee while it is still a larva.
VARROA MITES

Two Varroa mites on the back of a worker bee. These mites are large enough to be seen with the naked eye. Varroa mites are the primary cause of problems in a beehive.
PARASITES (Cont’d)

• How to treat against Varroa:
  – There are several methods to treat for Varroa mites; a short list follows but you should research what other beekeepers are doing in your area to treat.
  – You must learn to apply these treatments correctly to prevent contamination of honey, and resistance development by the mites.
    • Apistan Strips
    • Checkmite+ Strips
    • Sucroside
    • Oxalic Acid
    • Formic Acid
    • Ascetic Acid
    • Vaporized mineral oil
    • Essential Oils
VARROA TREATMENTS

• Treatments for Varroa Mite:

  – **Hard Chemicals:**
    • Will kill the Varroa Mites but **label instructions must be followed and do not leave on longer than recommended.**
      – Apistan
      – Check Mite +
      » Keep in mind Varroa have shown a resistance to Apistan and Check Mite upon continuous use.
    – Apiva

  – **Soft Chemicals:**
    • An effective treatment while leaving the least amount of residue.
      – Api Life Var
      – MiteAway
    • Both are 95% effective, however, both work through the evaporation of essential oils or organic acids, thus making them weather sensitive.

  – **Non-Chemical:**
    • Beekeepers have been using powdered sugar to monitor mites
      – If heavily dusted with a Destructo, it can control the mite population.
    • The Varroa reproduction is directly tied to the bee reproduction cycle. Because drones are capped longer as brood, the Varroa are more attracted to drone brood where they can lay more eggs.
      – Drone foundation or a
      – Drone frame, you can wait until the brood is capped, remove and destroy the foundation. Non-chemical or IPM techniques can be effective to control mites; however, they require dedication and time to be successful.
APISTAN

- Apistan strips (Fluvalinate - 10 strips per pack) will kill most Varroa Mites but resistance has been documented just like in Check Mite+ (Coumaphos).
- Don't treat with either and assume it has worked. You must be sure by monitoring your infestation levels.
- Follow the label instructions and do not leave strips on longer than recommended.
- Rotate your treatments!
APISTAN STRIPS (FLUVALINATE)

Apistan strips were among the first miticides used to treat for Varroa. It is rarely used today because the Varroa have built up a resistance to it.
CHECK MITE+

• This product (Coumaphos) is labeled for both Varroa mites and small hive beetles.
• It is sold under “Section 18” registrations and is not available in all states.
• Unfortunately many Varroa mites are resistant to this product; therefore, alternate with different medications.
• As with all miticides always follow label instructions.
COUMAPHOS STRIPS (CHECKMITE+)

As with Apistan, Checkmite+ was among the first miticides used to treat Varroa. Also like Apistan, Varroa have built up an immunity to the drug so that it is rarely used nowadays.
APIVAR

• Beekeepers now have an effective new Amiztraz based weapon again Varroa mites:
  – Kills up to 99% of mites in only one application.
  – Proved safe and effective for more than 15 years.
  – Leaves no significant residues in the wax.
  – Convenient and easy to use. Apivar is packaged in vacuum-sealed foil pouches that each contain 10 strips.
  – One application of 2 strips per brood chamber is sufficient to treat a hive.
  – Continuously released over a 6 week period.


**APIVAR**

Apivar, Like Apistan and CheckMite+, is considered to be among the “hard” chemicals used to treat Varroa.
**API-LIFE VAR**

- Api-Life VAR is 95% effective while leaving the least residue of any product available to beekeepers (legal or illegal).
  - Treat each colony by breaking 1 wafer into 4 pieces and placing around the brood nest.
  - Leave 7-10 days and replace with another wafer and after 7-10 days replace for a 3rd time. This will complete the treatment.
  - Treatment most effective at average daytime temperatures of 65°.
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PARASITES (Cont’d)

• How to prevent Varroa:
  – Just as there are several ways to treat for mites, there are several ways to prevent them. In some cases, the treatment and prevention methods are the same.
    • Screened bottom boards
    • Powdered sugar treatments
    • Drone brood removal
    • Small cell foundation
    • Queen bees with genetic behaviors to reduce mite numbers
    • The same chemicals listed above for treatment can aid in prevention
PARASITES (Cont’d)

• Tracheal Mites (*Acarapis woodi*)

  – How to recognize Tracheal mites:
    • Tracheal mites live in the trachea (“lungs”) of the honey bee and are therefore impossible to see. However, the presence of bees that are incapable of flight, despite normal wings, may be an indication.

  – How to treat against tracheal mites:
    • Menthol crystals placed in hive can help significantly reduce the numbers of tracheal mites. Grease patties may also help lower the population.

  – How to prevent tracheal mites:
    • The same methods for treatment can be used for prevention. Maintaining strong colonies will also help keep the effects of tracheal mites to a minimum.
TRACHEAL MITES

Microscopic mites found in the trachea of a honey bee. Detectable only under high magnification after dissecting the bee. Although they were a major problem in the 1980s, these mites are rarely found today.
PARASITES (Cont’d)

• Nosema (Microsporidian parasite):
  – How to recognize Nosema:
    • Nosema is caused by a protozoan and affects adult bees. The protozoan affects the digestive hind gut of the adults and can cause severe diarrhea which can be seen as fecal staining on the front of the hive.
    • Another effect is that the sick bees cannot produce royal jelly or effectively feed brood resulting in brood reduction. This disease typically occurs in the spring.
  – How to treat for Nosema:
    • An antibiotic such as Fumagillin can be used to treat the symptoms but it will not eliminate the spores produced.
  – How to prevent Nosema:
    • Keep hives well stocked with winter provisions of capped honey. Keeping the hive healthy and relatively free of other diseases, parasites and pests will also help. Good ventilation is a must.
EVIDENCE OF NOSEMA

Gut disease, characterized by dysentery, resulting in bee feces appearing on the inside and/or outside of the hive.
BACTERIAL BROOD DISEASES

• American Foulbrood (AFB)
  – How to recognize AFB:
    • The cell capping will be sunken rather than rounded and will typically be pierced or punctured. If you can see the larvae in the cell they will look melted and there will be a distinctive sour odor to the frame.
    • A test is to take a small piece of wood (toothpick, twig, matchstick, etc.) and insert into a suspect cell. Stir the remains and then slowly withdraw the stick. If you can pull the mass out and it adheres to the stick then it is likely that you have AFB.
  – How to treat for AFB:
    • If you have AFB in your hive, there is no true treatment to eliminate it from the colony. The only effective method is to burn the hive and bury the remains.
    • If you suspect that a hive of yours has AFB, contact your state bee inspector in the department of agriculture to have your hive(s) inspected.
  – How to prevent AFB:
    • AFB can be prevented by maintaining strong colonies. Also a preventative treatment of Terramycin can be applied (now requires a prescription from a veterinarian).
AMERICAN FOULBROOD

Characterized by sunken and perforated cell caps, as well as collapsed dead larvae with protruding tongues. AFB also has a distinctive noxious odor.
AFB “ROPINESS” TEST

Insert a toothpick, match stem or small twig into a cell. Then stir the contents of the cell and slowly remove the gelatinous larva. If it “ropes out” you have AFB.
BACTERIAL BROOD DISEASES (Cont’d)

• European Foulbrood (EFB)

  – How to recognize EFB:
    • Unlike AFB, larvae infected with EFB typically die BEFORE being capped. They lie twisted at the bottom of the cell in a reverse corkscrew shape. They will be a tan to brown color and will appear melted.
    
    • EFB killed larvae do not exhibit the same "ropy" results of a stick test like AFB. There may be a sour odor present but it will different than AFB.

  – How to treat for EFB:
    • EFB can be effectively controlled with antibiotics (Terramycin) prescribed by a veterinarian.
    
    • Also, requeening your hive will help as it breaks the brood cycle and the EFB reproduction cycle.

  – How to prevent EFB:
    • Keep a young vigorous queen in the hive (requeen every couple of years) and help the hive stay healthy and strong. Preventative treatments with antibiotics will help.
EUROPEAN FOUL BROOD (EFB)

The melted pupae in the perforated cells either have EFB bacteria or they have just been cannibalized down by hygienic bees.
FUNGAL BROOD DISEASES

• Chalkbrood
  – How to recognize Chalkbrood:
    • Chalkbrood is a fungal disease that affects the brood once they are sealed in the cells. Once they are dead, the larvae are chalky white and resemble mummies (kind of) that are spotted on the underside where the fungus discolors the corpse.

    • These dead larvae are then dragged out of the hive and deposited in the area in front of the landing board. It is then that you will notice the disease. These corpses will be hard and chalky rather than soft and squishy.

  – How to treat for Chalkbrood:
    • No treatment is recommended as colonies can recover on their own. However, you can requeen to help break the brood cycle. Also, chalkbrood will typically infect one frame at a time; remove this frame, freeze it and scrape it clean.

  – How to prevent Chalkbrood:
    • Keep your hives healthy with good ventilation.

    • Requeen every few years to keep a young vigorous queen laying good eggs in the hive.
CHALKBROOD

Various stages of Chalkbrood. Larvae become mummified and look like pieces of white chalk. Mummies are carried out of the hive by the bees and can be found on the ground in front of the hive. No treatment is recommended as colonies can recover on their own.
VIRAL BROOD DISEASES

• Sacbrood

  – How to recognize Sacbrood:
    • Sacbrood is a viral disease that typically is not a great concern. Brood that are affected change from pearly white to yellow, brown and eventually black. The entire larvae can be easily removed and will be contained in a sac-like membrane.

    • Typically, the colony overcomes sacbrood on their own without the beekeeper ever being aware of a problem.

  – How to treat for Sacbrood:
    • There is currently no medical treatment for sacbrood. If the colony has noticeable sacbrood, remove as much infected larvae as possible.

  – How to prevent Sacbrood:
    • Keeping your hive healthy and strong as well as regular requeening will help reduce or eliminate the incidence of this disease.
SACBROOD VIRUS (SBV)

Brood is encapsulated in a leathery sack. Beekeepers rarely consider Sacbrood a serious threat, however recent estimates suggest that one larva killed by the Sacbrood virus contains enough virus to kill over one million larvae.
OTHER VIRAL DISEASES

• Paralysis

  – How to recognize Paralysis:
    • Bees that are seen to tremble uncontrollably and are unable to fly may be exhibiting signs of either Chronic Bee Paralysis Virus (CPV) or Acute Bee Paralysis (APV).
    • They also lose their hair giving them a greasy look and they are submissive to attack (unlike robber bees who may have a similar appearance).

  – How to treat for Paralysis:
    • There is no known treatment for these viruses. Some research indicates that susceptibility to these viruses may be genetically linked.
    • Requeening or adding frames of sealed brood from a healthy hive may help.

  – How to prevent Paralysis:
    • Maintain healthy colonies and requeen on a regular basis. Treat for Varroa that are known vectors of viruses that cause paralysis.
PARALYSIS VIRUSES

Honey bee afflicted with a paralysis virus. Unable to fly - restricted movement. Hairless, greasy appearance, and pure black bees with no color are an indication of potential viral problems.
OTHER DISEASES

• Dysentery

  – How to recognize Dysentery:
    • Dysentery is **not a true disease** but a result of other diseases or conditions that prevent the bees from taking cleansing flights; it is also caused by food sources that are too water-rich.

    • Typically the bees defecate inside the hive and all over the hive entrance and landing board. These conditions can be caused by poor ventilation and food stores that did not ripen into true honey.

  – How to treat for Dysentery:
    • A similar treatment to that used to treat Nosema, such as Fumagillin, may help.

  – How to prevent Dysentery:
    • Keep hives situated in such a manner as to prevent too much rain or snow accumulating on/in the hive. Ensure good ventilation and if a fall feeding is necessary, do so early enough to allow the bees to fully cure the food.
EVIDENCE OF DYSENTERY

Gut disease, characterized by dysentery, resulting in bee feces appearing on the inside and/or outside of the hive.
OTHER BROOD PROBLEMS

• Chilled Brood (Not actually a disease)
  
  – How to recognize Chilled brood:
    • Chilled brood occurs when the brood chamber becomes too large for the bees and they cannot keep the developing young warm or the hive is left open in the cold. Brood killed in this manner turn gray and may resemble sacbrood.

  – How to treat for Chilled brood:
    • There is not any real treatment for chilled brood; once the weather warms or the colony grows, they will be able to care for the brood more effectively.

  – How to prevent Chilled brood:
    • Do not work your bees in cold weather, replace frames in the same order they were removed when performing cool weather inspections and do not leave frames of brood outside of the hive for any longer than absolutely necessary.
CHILLED BROOD

This condition is totally the fault of a careless beekeeper! Never open a hive below 55 degrees Fahrenheit and then don’t leave it open long unless it is 75 degrees or warmer.
PREDATORS

• **Birds**
  – **Signs of predation:**
    • You may only notice birds eating your bees when they are in flight. The birds will swoop down near the hive and take the bees on the wing.
  – **Prevention:**
    • Almost impossible to prevent. However, the number of bees eaten by birds should be minimal (unless it is a whole flock).

• **Skunks**
  – **Signs of predation:**
    • Skunks will scratch at the entrance of the hive to draw the bees out. They then consume the adult bees as they fly out of the hive. Typically this will happen at night and skunks can decimate a colony in no time at all.
    • They also irritate the bees making them cranky and difficult to work. Look for signs of scratching on the hive and skunk feces with bee exoskeletons in it. There may also be mud and torn up vegetation in front of the hive.
  – **Prevention:**
    • Raise your hive up off the ground; higher is better. Skunks must then stand on their hind legs to reach the entrance exposing their tender under belly to the stings of your colony. Another option is to put a carpet tack strip, with the nails facing up, in front of the hive.
BIRD EATING A BEE

Birds are natural predators of the honey bee and view them simply as a source of nourishment.
SKUNK AT A BEEHIVE

Evidence of skunk predation can be seen in digging in front of a hive and scratching on the front of a hive.
PREDATORS (Cont’d)

• **Raccoons**
  – **Signs of predation:**
    • Raccoons are smart animals and they can figure out how to take the cover off of the hive to get at the bees/brood/honey/pollen inside.
  – **Prevention:**
    • Place heavy rocks or bricks on top of the hive to prevent the raccoon from lifting the cover off. Also try the tack strip trick for skunks all around the hive.

• **Bears**
  – **Signs of predation:**
    • Bears will typically knock the entire hive over and scatter the frames and supers as it consumes everything in the hive. An apiary that has had a bear visitor is a sorry sight.
  – **Prevention:**
    • An electric fence is the only truly effective method of keeping bears away from your hives. You could try a similar trick to that of skunk prevention and put larger nails, in place of tacks, through the boards - but you would need these to surround the entire apiary.
DAMAGE CAUSED BY RACOONS

Notice that, not only is the hive overturned, but the entire contents have been eaten.
PROTECTION AGAINST BEARS

If your hives are in an area inhabited by bears, the only effective protection is an electric fence around the bee yard.
CONCLUSION

• All of the things listed above can and do have major damaging effects to both bees and beekeeping equipment but most colony losses are directly attributable to one of two causes:
  – Varroa mites
    • Carriers (vectors) of viruses causing multiple diseases.
  – Starvation
    • During periods of forage dearth, beekeepers fail to notice low food stores and do not feed their bees.
SIGNS OF STARVATION

Dead bees clustering on the frame and covering the floor are certain indicators that the bees have died of starvation.
Thank you for your time and attention!

QUESTIONS?
If you would like to have a copy of this presentation for review, it is available on my website www.RoseHillFarmLLC.com along with other presentations of mine.
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