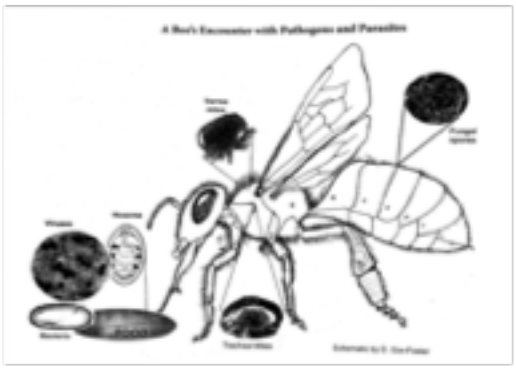
BEGINNING BEEKEEPING

CLASS 5: DISEASES, PESTS, & PESTICIDES

BEES ARE EXPOSED TO MANY THINGS



BEFORE WE TALK ABOUT THAT

- Healthy bees and strong colonies can deal with a lot of what comes at them
- We can help by making sure they have good nutrition, strong queens, and a safe environment
- Use IPM (Integrated Pest Management) as much as possible
- Early detection and response is critical

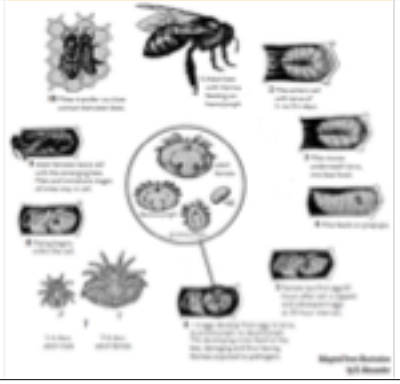
THE BIG THREE

- Varroa Destructor
- Small Hive Beetle
- Wax Moths

VARROA DESTRUCTOR

- Initially found in Asian Honey Bees where they are not a concern
- First reported in US in 1986
- Mite that feeds on fat body of bees
- Mite is not the problem - the viruses it vectors is the problem (maybe as many as 24 at last count)
- You have to monitor or you will lose your bees and you can also take out other beekeeper's bees.

VARROA DESTRUCTOR - KNOW YOUR ENEMY!



VARROA MONITORING

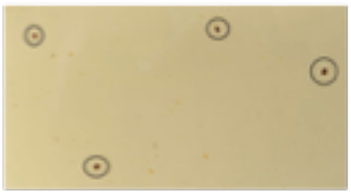
- Sugar shake - most common/no bees die
- Alcohol wash - also common/bees die
- Ether roll - not recommended for hobbies
- Sticky boards - only with sugar shake/ alcohol wash
- Visual monitoring - brood/worker bees - not recommended as only approach

SUGAR SHAKE

Make your own kit

Buy from Bee Supply

COUNTING VARROA



THIS WOULD BE REALLY BAD

SUGAR SHAKE BROCHURE

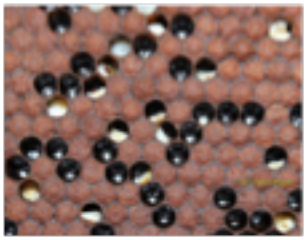
- https://www.beelab.umn.edu/sites/beelab.umn.edu/files/varroa_brochure_final_print_2.23.17.pdf

WHAT DOES THIS TELL YOU?

Colony Phase	Acceptable Further control not needed	Caution Control may be warranted	Danger Control promptly
Dormant with brood	<1%	1-2%	>2%
Dormant without brood	<1%	>2-3%	>3%
Population Increase	<1%	>2-3%	>3%
Peak Population	<2%	>3-5%	>5%
Population Decrease	<2%	>2-3%	>3%

WHAT YOU MIGHT SEE

Deformed Wing Virus



Parasitic Mite Syndrome

COMMERCIAL TREATMENTS

- Apistan - Fluvalinate
- Apivar - Amitraz
- Api Life Var - thymol, eucalyptus oil, menthol and camphor
- Apiguard - thymol
- Hop Guard - Hops
- Formic Acid - Formic Pro/Miteaway Quick Strips
- Oxalic Acid - drizzle or vaporization

HOW DO YOU DECIDE?

- Some are temperature sensitive
- Some require broodless period

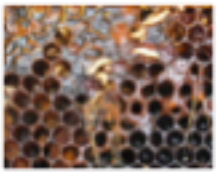
https://honeybeehealthcoalition.org/varroa/

CERTIFIED NATURALLY GROWN PROGRAM

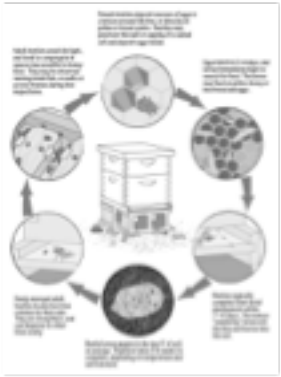
- https://www.cngfarming.org/apiary_standards#treatment https://www.cngfarming.org/

SMALL HIVE BEETLES

- First appeared in Florida in 1998. From Africa.
- Small beetle about 1/4 inch in size
- Feed on honey and pollen

LIFE CYCLE OF SMALL HIVE BEETLE

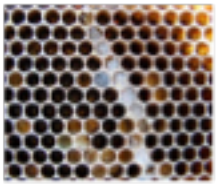


CONTROLLING

- Traps: Make your own or buy from dealer (beetle blaster, etc.)
- Disrupt Pupal Process: diatomaceous earth, nematodes
- Freeze frames

WAX MOTHS

- Pretty much found in all hives
- Strong hives can manage them
- Prominent in brood comb


CONTROLLING

- Strong hives are the best defense
- Traps - make your own
- Freeze frames
- Spray frames with BT (approval by USDA?)
- Store frames with Para Dichlorobenzene crystals

OTHER DISEASES - NOSEMA

- Two kinds - Nosema Apis & Nosema Ceranae
- Fungus in bee gut
- Nosema Apis is generally identified with dysentary
- Nosema Ceranae more prevalent now. Hard to detect without microscope
- Healthy hive can die quickly with N. Ceranae

TREATING NOSEMAS

- Most treatment recommends Fumagellin-B but no longer recommended
- Honey-B-Healthy drench may help

EUROPEAN FOUL BROOD

- Stress related disease on the rise in NC
- Poor nutrition and rainy weather seems to increase probability

EUROPEAN FOUL BROOD

- Larva die in irregular twisted positions
- Larva may change from light cream to grayish brown as the larva dries up
- Sour odor may be present in the hive
- Dead larvae are not ropy as AFB larvae

EUROPEAN FOUL BROOD TREATMENT

- If you suspect EFB, first call your apiary inspector for advice. If they recommend Terramycin, you will need to get it from a veterinarian that is part of the Honey Bee Veterinary Consortium https://hbvc.org/

NC BEE INSPECTORS

- https://www.ncagr.gov/PLANTINDUSTRY/Plant/apiary/apiaryinspectors.htm

AMERICAN FOUL BROOD

- Irregular Brood Pattern
- Healthy larva are white, diseased are light to dark brown
- Dead larva become gluey or ropy

AMERICAN FOUL BROOD

- If you suspect AFB — definitely call Apiary Inspector

OTHER DISEASES YOU MAY ENCOUNTER

- Sacbrood - usually with PMS
- Chalkbrood - more often found in hives used for pollination but possible if buying nuts from pollinators

OTHER DISEASES YOU MAY ENCOUNTER

- Tracheal mites are microscopic parasites that live in the breathing tubes of adult honey bees where they feed on bee blood.
- Most breeds of bees are now pretty resistant
- Infested adults may act irritated or disoriented and exhibit deformed (K) wings.

TRACHEAL MITE TREATMENT

- Menthol
- 50/50 mix of Menthol & Vegetable Shorting grease patties
- Api Life Var

WHAT IS IPM?

- Methods of keeping pests at or below an acceptable level.
- Typically do not involve chemicals
- Require vigilance to determine pest levels
- Anticipate the life cycle of the pest
- Help optimize the colony's ability to manage the pest

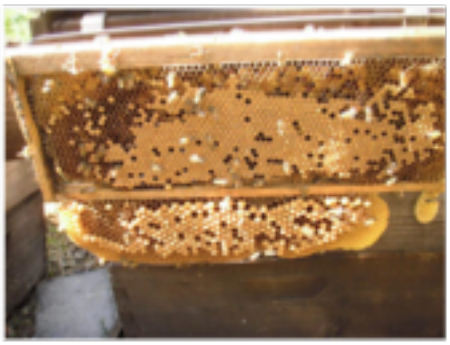
SOME COMMON METHODS

- Pick queens that are bred to deal with mites and have disease resistant traits
  - VSH, Hygienic, Russian, Purdue Leg Biters
- Maintain the hive at optimum population levels which allows the hive to control many pests themselves (like wax moths)
  - Don't over super
  - Remove equipment when necessary
- Put hives in full sun (or as much sun as you can)
- Improve ventilation using screened bottom boards and shims to raise cover

SOME COMMON METHODS

- Replace brood comb every couple of years
- Use drone frames for mite trapping

DO IT YOURSELF DRONE COMB



PYRAMID OF IPM TACTICS

CULTURAL CONTROLS

- Site location
- Resistant queens
- Small cell foundation
- Breaking brood cycle

MECHANICAL CONTROLS

- Sticky boards
- Screened bottom boards
- Drone trapping
- Requeening
- Hive beetle traps

BIOLOGICAL CONTROLS

- **BT (Bacillus Thuringiensis) - wax moths**
- **Nematodes - small hive beetles**

BIOPESTICIDES OR BIO-RATIONAL PESTICIDES

- Essential Oils - Spearmint, wintergreen, peppermint, thymol, etc.
- Organic Acids - oxalic or formic
- Powdered Sugar
- Repellents
- Diatomaceous Earth

CONVENTIONAL PESTICIDES

- Coumaphos - Checkmite
- Fluvalinate - Apistan
- Amitraz - Apivar, Taktic (now banned in US)
- Fumagillin B - Nosemas (questionable)
- Paradichlorobenzene - storing frames only
- Tylosin - for AFB (veterinarian)
- Terramycin - for EFB (veterinarian)

OTHER PESTS

- Bears and Skunks
  - Electric fences can deter bears but if they want in they will usually get in.
  - Bears eat brood, Yogi eats honey
  - Skunks can be deterred with a nail board below the hive entrance

OTHER PESTS

- Ants
  - More of a nuisance than a problem
  - Cinnamon for small ants, grits for big ants
  - Hive stand legs in water or oil pans

OTHER PROBLEMS

- Wind and Natural Events
  - Tall, unbalanced, hives can be blown over
  - Trees and limbs can also cause serious damage
- Pesticides
  - Replace brood frames every couple of years
  - Educate folks about Seven dust
  - Stay aware of your environment

NEXT WEEK

- Catch up week
  - Stings
  - More resources - clubs, organizations, conferences, publications, etc.
  - Installing nucs and packages