NOSEMA

- A unicellular fungus (microsporidia)
- Adult infected in its spore (resting) form
- Spores germinate inside the gut (injects spores into the epithelial cells of the ventriculus)
- Interferes with the bees ability to digest food by inhibiting digestive enzymes

Effects on Bees
- do not exhibit obvious external disease symptoms
- increased energy consumption
- underdeveloped hypopharyngeal glands of nurse bees
- shortened lifespan (50 to 75%)
- young queen if infected superceded (often within 2 to 3 weeks)
- forage earlier, more often, and collect less pollen
- reduced willingness to share food in hive

N. apis

Seasonal relationship: spore levels lowest in Summer

N. ceranae

- most common type in US
- reduces homing abilities (? Orientation vs energy)
- increases as season progresses
- common cause of failure to thrive

Treatment
- Fumagillin B
  Heat sensitive (only add to cool syrup); light sensitive; viable for 2 weeks in syrup
  Toxic to mammals (birth defects) NOT FOR USE DURING FORAGING SEASON
- increased feeding
- oxalic acid (? Formic acid)

Things You can Do
- clean hive tools between hives
- freeze frames X 1 week
- better nutrition (pollen) at all times when broodrearing
- minimize crushing of bees during hive manipulation
- winter hives in sunny locations to encourage cleansing flights
- rotate out old frames
- oxalic acid
- disinfect with bleach solution (1 part bleach to 9 parts water)
- sunlight (UV light)
- ? probiotic two weeks after treatment with Fumagillin B

Nosema Sampling
- need older bees (Nosema 2.9X higher in older bees)
- bees at entrance midday or off inner lid
- 15 bees
- freeze in baggie
- add 15ml water (1/2 oz)
- crush with rolling pin to macerate bees (break open all abdomens)
- place drop on slide, apply cover slip

Microscope
- 400X magnification
- Lens magnification “40” and ocular magnification “10”
- Make sure light is on – not too bright- “5 or 6” is usually good
- Adjust the deck (forward/backward; left/right)
- Search for Nosema spores: lift slide till almost touching, slowly back away using smaller knob in ¼ turns till Nosema comes into view
- Look at 3 fields of view (3 areas of slide) and count Nosema in each
- If average 15 or more, you have reached treatment threshold
- Although the spores of N. apis and N. ceranae have slight morphological differences, the only reliable way to differentiate them is an electron microscope or polymerase chain reaction (PCA) analysis
Works Cited


