

HONEY BEE  
DISEASES AND  
PESTS



Nosemosis and  
Amoeba infections



# Nosemosis

- The species found in Nosema genus are microsporoidal entomopathogens.
- They cause pathogenicity in honey bees, bumble bees, and silkworms.
- In recent years, it has been confirmed in many countries that *N. ceranae* is associated with "sudden colony collapse".
- The causing agents are *N. ceranae* and *N. apis*.
- They are widespread in Turkey.
- They are actually highly developed parasitic fungus.
- They are vegetative form in the cell, while spore form in outside of host.



- They parasite on the cells of the digestive system.
- The spores belonging to Nosema species are opened from the rear end after entering the digestive tract of the bee. enter the digestive tract of the bee, and then the polar tube goes out and initiates invasion of the bowel epithelium.
- The first stage of Nosema's intracellular development begins with the merogony, proliferative cell division.



- Nosema species affect the hemolymph-nutrient balance of the host.
- In Nosema infection, all of the epithelial cells in the digestive system lose their normal function within 14-21 days.



- Diarrhea
- Diarrheal feces in the flying board and the cover of hive are most important signs of the infection.
- There are bees walking and not flying in front of the hive.
- Bifurcation of wings, swelling of the abdomen and disappearance of the sting reflex are seen.
- The disease emerges especially in spring.



Amoeba Infection



- The infection caused by *Malpighamoeba mellificae*, which is rarely seen in adult honey bees, is usually mixed with nosemosis.
- The agent is an amoeba species and multiply by binary fusion.
- The malpighamoeban tubules, which are the evacuation organ of the bees, are location of this pathogen.



- It can be seen in the colonies that are located in damp places, are infected with *Nosema* spp., have old queen and weak living force.
- It has been determined that the infected colonies are associated with Bee virus X, which is usually seen in winter months.
- *M. mellifica*-derived diarrhea is different from the ordinary diarrhea.
- Common diarrhea cases are non-contagious and well-treated.
- However, amoebiasis is contagious and can not be treated with only nutritional support.
- In the amoebiasis of honey bees, violently buzzing bees as well as stinky, sulfur yellow and juicy diarrhea are noteworthy.
- This disease is also encountered in spring months as similar with nosemosis.



- Diagnosis of the disease;
- Macroscopic diagnosis with inspection: The reliability is low and the abdomen of the bee is extracted from the last tergite which is the sixth tergite, and then the organs of the digestive system are examined.
- Fresh bee samples are used.
- The infected intestines are tympanic and the middle intestine is mil-white color.
- Healthy ones are brown color.



- Microscopic diagnosis:
- The abdomens belonging to 25 field bees are homogenized with 25 ml water.
- A drop is taken and examined under X400 magnification.



- Diagnosis with staining:  
Safranin and nigrosine  
staining methods
- Serological diagnosis
- Molecular diagnosis
- Electron microscopic  
diagnosis
- Cell culture and  
hybridization



# Treatment

- Fumagilin
- Thymol can be used as alternative treatment.

# Prevention and Control

- The parasites spread with horizontally among colonies.
- Plundering of weak colonies infected with Nosema by powerful colonies results in the contagion of honey contaminated with Nosema spores to healthy colonies.
- Changing of materials between different colonies and interchanging of frames between weak and strong colonies play role in the spreading of both Nosema spores and Amoeba cysts.
- General hygiene rules need to be considered.



- In order to benefit from the drugs used for conservation and treatment, contaminants infected with Nosema spores such as syrups, water, cakes, pollen and all the materials inside and outside the hive must be changed absolutely.
- Otherwise, only short-term treatment and protection against active forms of Nosema are provided.
- Disinfection of hive and materials with acetic acid (vinegar) or carbonic acid should be applied before and after the season.
- Additionally, individual materials should be used.