

Diseases of the honey bee

- Diseases of the honey bee are caused by:
 - parasites
 - viruses
 - bacteria
 - moulds;
 - and there are non-contagious diseases

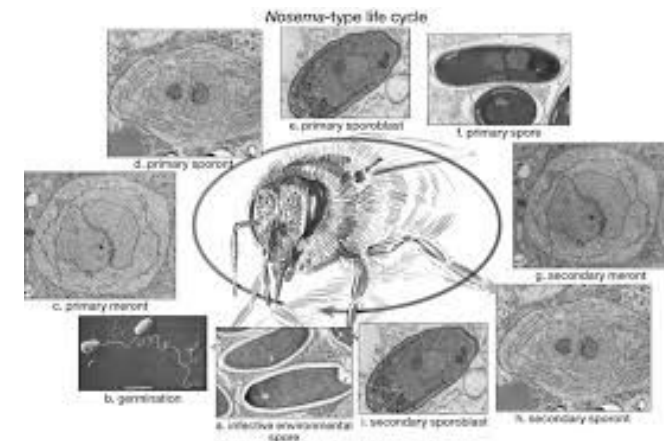
Causes of spread of disease

- malpractice, uncontrolled exploration, uncontrolled international traffic and poor veterinary control have led to expansion of various bee diseases

Nosemosis



- The Nosema disease is a parasitic disease of adult honey bees (*Apis mellifera*) caused by two species of microsporidia belonging to *Nosema* genus
- These parasites are classified as parasitic fungi belonging to the group of *Microsporidia*; they live and reproduce in a living cell (they are intracellular) of the host (adult honey bee) while their spores survive in the environment for a long time



- The most common parasitic fungi from *Microsporidia* group, belonging to Nosemosis family are:
 - *N. bombi* –bumblebee parasite
 - *N. vespula* –wasp parasite
 - *N. apis* –European honey bee parasite
 - *N. ceranae* –Asiatic and European honeybee parasite

Life cycle of microsporidia

- There are three stages:
 - infective stage
 - proliferative stage
 - stage of sporangia

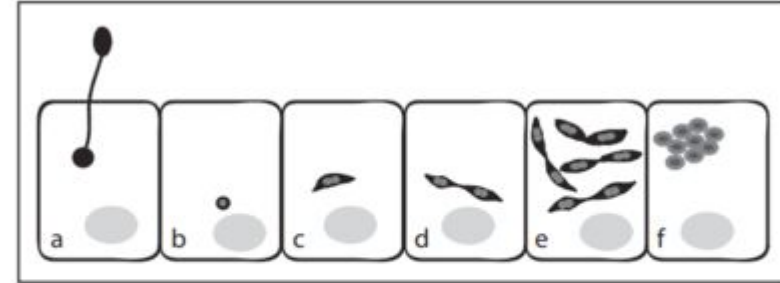
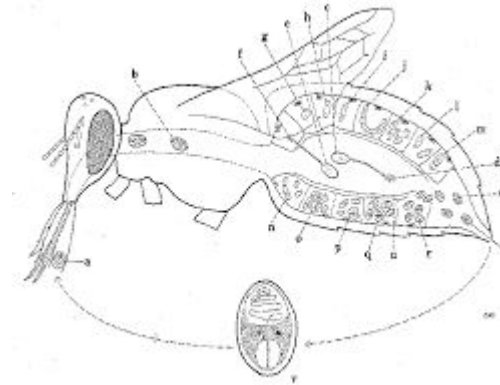


Fig. 4. Schematic representation of the early events in the life cycle of *N. ceranae*. Spores extrude the polar tube which pierces the cell membrane of the target cell followed by injection of the sporoplasm into the host cell (a). The sporoplasm appears as small spherical body in the host cell (b) and then develops into a spindle-shaped meront (c), which begins to divide giving rise to paired meronts (d). These pairs of meronts then undergo several rounds of cell division (e) until they separate and develop into round to oval sporonts, which are condensed and characterized by a thickened plasma membrane (f).



Nosemae apis

- It is assumed that natural host of this parasite is European honey bee *Apis mellifera*
- This parasite inhabit the epithelial cells of small intestine of an adult honey bee
- It spreads in a form of spores
- Spores enter the honey bee body via infected food and drink

- After reaching mid gut, *N. apis* multiplies in a short period of time and causes digestive system disorders
- Faeces of healthy bees is white, while infected bees' faeces is brownish, liquid and sticky



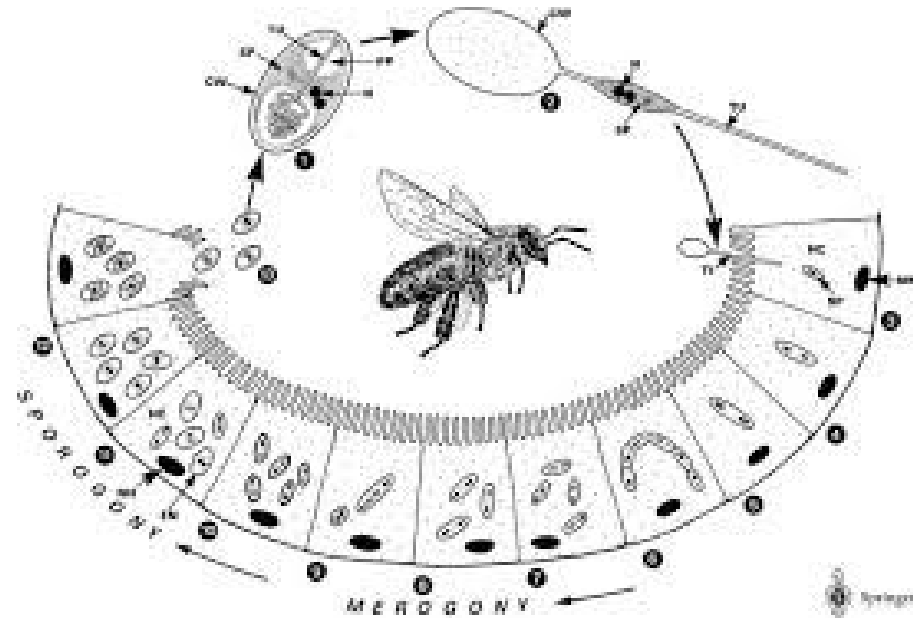
- The infection occurs in early spring; and obvious signs of infection presence are faeces traces on beehive walls and surrounding area



Nosema ceranae

- The first nosemosis infection of European honey bee in Europe was observed in 2005
- *N.ceranae* is usually hosted by Asiatic honey bee

- *N. ceranae* spread via spores germination in honey bee's digestive system; it causes disorders of hypopharyngeal glands so bees are not able to produce royal jelly which is an essential food for the brood and queen



- This leads to malnutrition of adult honey bees, larvae, workers and loses of population in a community
- Called „The quite bees executor” – the disease has no obvious symptoms, unlike *N. apis* does – bees die out of the beehive, exhausted



Source of infection

- The most common sources of infection are infected water, honeycomb polluted with faeces and honey from polluted honeycomb
- The disease is spread via robbing – infected honeybees attack other beehives in search for food and transmit the causative agents
- The causative agents can be transmitted by a beekeeper while working at the apiary

Spread of the disease

- The disease is most commonly spread by passerine bird, Yellow bee-eater (*Merops apiaster*)



- The spread is also caused by uncontrolled transport of honey bee colonies and poor veterinarian control measures

Prevention measures

- To prevent the disease spread it is necessary to keep hygiene procedures, to maintain regular disinfection measures and to enable colonies to be in a strong, healthy and vital condition

Treatment of nosemosis

- There is no cure for nosemosis!
- As a prevention, beekeepers use „Nozevit“- natural herbal product used as a food supplement, applied in autumn and in spring



Thank you for attention!
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