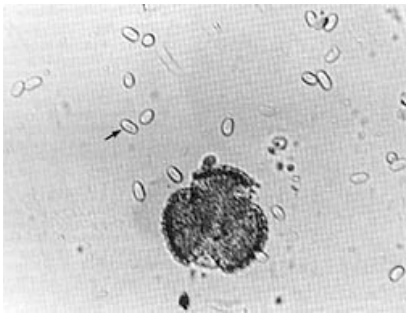
Nosema

Cause

Nosema disease is caused by the protozoan parasite *Nosema apis*. It is a single celled organism with 2 nuclei and a coiled hollow polar filament. At one stage in its life cycle it turns into a spore which is long lived and very resistant.

Disease



Nosema spores and Pollen grain
Picture © IBRA

The spore is ingested by the bee as it cleans up cells. It hatches in the ventriculus and attacks the epithelial cells. It uses its polar filament to penetrate the epithelial cell wall and the nucleus of the spore passes into the cell. Here the parasite multiplies producing more spores. Infection takes about 10 days to develop by which time several hundred thousand spores could be present. The spores are released on the death of the epithelial cell and pass into the rectum. Rectal contents build up and unless the bee is able to take a cleansing flight may be deposited on the comb thus spreading the disease.
The disease is endemic in the UK and widespread throughout the world.
There are also 3 viral infections associated with *Nosema* namely Black Queen Cell Virus, Filamentous Virus and Bee Virus Y.

Signs in the colony

Infected bees show no outward signs of the disease. The most common sign is a failure of the colony to build up in the spring. In badly infected colonies there may be evidence of dysentery and dead bees outside the hive.
Because the parasite uses the epithelial cell and its enzymes to reproduce it deprives the bee of protein from digested pollen. This can shorten the bees life by 50%.
The lack of protein inhibits the development of the hypopharyngeal glands and thus the production of brood food. There is also a reduction in the fat bodies of winter bees and a reduction in the amino acid content of the haemolymph. All these factors lead to a reduced life span.

Diagnosis

This can only be done by microscopic examination of the ventriculus and demonstration of the spores.

Spread

Nosema spores are spread through the hive by bees that were unable to take cleansing flights and soiled the combs and the hive entrance.
Spread between colonies can be due to robbing, drifting and comb exchange.

Treatment

When disease is confirmed feeding the bees a sugar syrup containing ‘Fumidil B’ will prevent the spores developing in the ventriculus. It does not kill the spores.
Autumn treatment in the year of diagnosis should be followed by a spring treatment the next year should be used.
In spring, to reduce the risk from contaminated comb, a ‘Bailey frame change’ should be performed or more drastically use the ‘shook swarm’ technique.

Control

Apart from treating badly infected colonies it is important to make sure that everything is kept clean.

Try to avoid squashing bees on examination as this will release spores which are cleaned up by the bees.

Reduce the risk of spread between colonies by controlling robbing and drifting.

Although most colonies are infected you do not want to increase the load.

Disinfect any comb you wish to keep by fumigating with acetic acid

Replace brood comb on a regular and planned basis. Use ‘frame change’ techniques in heavily infected colonies.

Queens can be infected with *Nosema* so a queen replacement should be considered.