

Nosema and Varroa in the same colony may be the cause of Colony Collapse Disorder

William Kirk, our Education Secretary, has highlighted the following article:

Iridovirus and Microsporidian Linked to Honey Bee Colony Decline

Background: In 2010 Colony Collapse Disorder (CCD), again devastated honey bee colonies in the USA, indicating that the problem is neither diminishing nor has it been resolved. Many CCD investigations, using sensitive genome-based methods, have found small RNA bee viruses and the microsporidia, *Nosema apis* and *N. ceranae* in healthy and collapsing colonies alike with no single pathogen firmly linked to honey bee losses.

Conclusions/Significance: These findings implicate co-infection by **invertebrate iridescent virus (IIV)** and ***Nosema*** with honey bee colony decline, giving credence to older research pointing to IIV, interacting with *Nosema* and mites, as probable cause of bee losses in the USA, Europe, and Asia. We next need to characterize the IIV and *Nosema* that we detected and develop management practices to reduce honey bee losses.

Citation: [Bromenshenk JJ, Henderson CB, Wick CH, Stanford MF, Zulich AW, et al. \(2010\) Iridovirus and Microsporidian Linked to Honey Bee Colony Decline. PLoS ONE 5\(10\): e13181. doi:10.1371/journal.pone.0013181](#)

Information from [BEEBASE](#) on Nosema

Two *Nosema* species have been identified in honey bees in England and Wales, *Nosema apis* and more recently the Asian species *Nosema ceranae*. Both are highly specialised parasitic Microsporidian fungal pathogens. *Nosema* spp. invade the digestive cells lining the mid-gut of the bee, there they multiply rapidly and within a few days the cells are packed with spores, the resting stage of the parasite. When the host cell ruptures, it sheds the spores into the gut where they accumulate in masses, to be later excreted by the bees. If spores from the excreta are picked up and swallowed by another bee, they can germinate and once more become active, starting another round of infection and multiplication.

Symptoms of Nosema

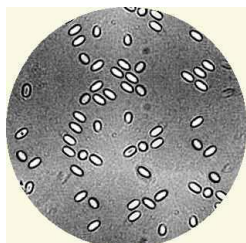
There are no outward symptoms of the disease. Dysentery is often seen in association with *N. apis* infections; this may be seen as 'spotting' at the hive entrance or across the frames. The dysentery is not caused by the pathogen, but as a consequence of infection and can be exacerbated during periods of prolonged confinement during inclement weather, especially during the spring. This can lead to the bees being forced to defecate in the hive, therefore contaminating it further.

In Spain it has been reported that *N. ceranae* infections are characterised by a progressive reduction in the number of bees in a colony until the point of collapse. The beekeeper may also see a significant decline in colony productivity. In the final phase of decline, secondary diseases frequently appear, including chalk brood and American foul brood. Eventually the affected colonies contain insufficient bees to carry out basic colony tasks and they collapse. Mortality in front of the hives is not a frequent symptom of *N. ceranae* infection. Dysentery and visible adult bee mortality in front of the hives are reported to be absent in *N. ceranae* infections. Dwindling can sometimes be rapid or take place over several months.

Further Information

[Nosemosis of the Honey bee, OIE Terrestrial Manual 2008](#)

[Bee Craft article: Nosema ceranae, Jan 2008](#)



What can the beekeeper do?

- **Avoid moving combs (especially brood) between colonies**
- **Move colonies after dusk and ventilate, to reduce stress**
- **Suspect nosema if you find streaks of dysentery on the hive front**
- **Collect a sample of 30 bees from each colony to check for nosema under a high power microscope (x400)**

If there is sufficient interest, we will organise a microscopy evening in Spring, so collect and label your samples, and freeze them.



The gut of the honeybee is shown distended due to nosema infection

Nosema is readily spread through the use of contaminated combs.

The spores can remain viable for up to a year, it is therefore important not to transfer contaminated combs between colonies and as always to practice good husbandry and apiary management, maintaining vigorous, healthy stocks, which are better able to withstand infestations.

Diagnosis and Treatment

The simplest method of diagnosis of infections is by microscopic examination. Both *N. apis* and *N. ceranae* can be identified in adult bee samples using a standard adult disease screen - under the light microscope the spores of *N. apis* and *N. ceranae* appear as white/green, rice shaped bodies. However, both species are virtually identical when viewed using conventional microscopy, but can be distinguished by an expert eye. However, more accurate discriminatory tests are available which detect differences between the two species using genetic methods

Currently treatment with the antibiotic Fumidil B available in the UK is an effective control against both *Nosema* species. As with all medicines ensure that the label instructions are followed.