

Chronic bee paralysis: An information note for beekeepers

What is chronic bee paralysis?

Chronic bee paralysis is a disease of adult honey bees caused by chronic bee paralysis virus. The virus replicates in nerve cells leading to repeated patterns of movement which progress to partial paralysis, full paralysis, and then death within a week. Infected adult bees may exhibit trembling or shaking symptoms, and do not respond to external stimuli like smoke. Healthy honey bees nibble the wings and bodies of diseased bees as they attempt to remove them from the hive. This leads to diseased bees becoming shiny, or appearing darker as they become denuded of hairs and the cuticle becomes visible (Figure 1A and B). The disease can progress rapidly, leading to piles of dead and dying bees at the colony entrance and on the bottom board (Figure 1C).

Figure 1: Individual and colony level symptoms of chronic bee paralysis



How do the symptoms differ from pesticide poisoning?

At first, the symptoms of chronic bee paralysis and pesticide poisoning may appear similar. Most insecticides target the nervous system of insects and can lead to twitching or involuntary movements, but there are key differences between pesticide poisoning and chronic bee paralysis. Pesticide poisoning tends to lead to carpets of dead bees in the apiary, as the foragers return from contaminated sources and rapidly succumb to the pesticide. In contrast, chronic bee paralysis causes death inside the colony, leading to piles of dead bees at the hive entrance. Sometimes bees suffering from pesticide exposure lie on their backs spinning as they rapidly beat their wings and attempt to fly. This is not a symptom associated with chronic bee paralysis.

How common is chronic bee paralysis?

Chronic bee paralysis has been associated with honey bees for 1000s of years, with disease occurrence fluctuating over time and between countries. Recent decades have seen an increase in reported disease across England and Wales, and other countries like China and the US have also reported detecting chronic bee paralysis virus more frequently. The virus that causes chronic bee paralysis is common in apiaries across England and Wales, but in most cases remains at low levels and does not cause disease. Chronic bee paralysis can appear in any month of the active season, but is most often seen in early summer.

How is chronic bee paralysis virus transmitted?

The virus has several ways that it can move between honey bees, but it is not thought to be transmitted by *Varroa* mites. Emerging honey bees are generally virus free and contract the virus after eclosure. Adult honey bees can become infected after consuming infected food, or after bodily contact with diseased and dead honey bees. The shaking symptoms develop within a few days and an infected honey bee usually dies within a week of contracting the virus.

Are some races of honey bee more susceptible than others?

Chronic bee paralysis has been reported in all races of honey bee commonly found in England and Wales including *Apis mellifera mellifera* (European dark bee), *Apis mellifera ligustica* (Italian bee), and *Apis mellifera carnica* (Carniolan bee). The disease can also affect honey bee crosses such as Buckfast, as well as locally reared honey bee stocks.

What is the best way to manage a diseased colony?

Unfortunately, chronic bee paralysis is a severe disease and colony loss occurs in 40 to 50% of cases. The virus is transmitted between honey bees more efficiently when they are crowded together so, creating space by adding a brood box or a super can help to reduce virus transmission. Ensuring the colony has ample access to pollen is important because pollen stress is known to increase chronic bee paralysis symptoms, and young bees raised during times of pollen dearth can be more susceptible to the virus. Honey bee queens can also catch the virus and die, and it is common for colonies suffering from chronic bee paralysis to lose their queen. Checking for a laying queen is important so that remedial action can be taken should the queen be lost to the disease. There is no evidence that changing the queen will help manage the disease.

Honey bees that have died from chronic bee paralysis can spread the virus to healthy bees, so increasing the size of the hive entrance may help the colony to remove the dead bees and reduce the spread of virus inside the hive. Removal of floors is not recommended, because it can lead to robbing of the weakened colony, particularly later in the season when predation by wasps is heightened. Colonies that survive chronic bee paralysis can be weakened and sometimes perish during the winter. Providing aftercare to ensure colonies enter winter as strong as possible and with sufficient stores can help to prevent overwinter colony loss.

What is the best way to prevent spread from a diseased colony?

Chronic bee paralysis can sometimes be seen moving along a line of honey bee colonies. Honey bees suffering from severe symptoms can sometimes still fly, and so limiting the movement of adult honey bees between colonies will help to reduce the spread of the virus. Drifting between colonies can be reduced by facing hive entrances in different directions. Honey bees that have died from chronic bee paralysis remain infectious for many months, and may represent an important source of infection in an apiary. It is advised that piles of dead bees should be moved away from the entrance to where they are less likely to come into contact with live honey bees.

Where can I find out more information?

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