



BEEKEEPING BASICS - PESTS AND DISEASES

Sacbrood virus

Sacbrood virus (SBV), or *Morator aetatulas*, is an infectious virus affecting honeybee larvae in many areas of the world. Larvae die off before fully transforming into pupae, leaving a distinct sac-like appearance in the affected brood. The infection typically presents in the colony growth phase — often in the spring. Once SBV infiltrates honeybee larvae, the larvae fail to pupate and ultimately die off.

While sacbrood is often only a minor issue, this affliction causes significant damage within a colony if it is stressed or weak. Infection can lead to large areas of affected comb where the queen will refuse to lay more eggs. Additionally, infected adult bees will also have a shorter overall lifespan. As a result, the overall strength and function of a colony is compromised.

Symptoms

PRESENCE OF DYING OR DEAD LARVAE AND PIN-SIZED HOLES IN CELLS

Dead or visibly dying larvae is the first indication of a potential sacbrood infection. The brood will die after it has been capped but before fully changing into a pupa. Beekeepers can identify expired larvae in both capped and uncapped cells. In many cases, affected cells present with a small pin-sized hole on the top of the cell.

GRAY TO YELLOW-BROWN DISCOLOURATION

Initially affected brood first appear grayish in colour. As the sacbrood infection worsens, the larvae changes to yellow with a darker head. Over the course of a few days the yellow colour shifts into a darker brown to black.

How It Spreads

Most research indicates that contraction of SBV comes through contaminated nectar, pollen and

water. Worker bees may make contact with the virus in their normal collection procedure then bring back the infection to the colony. From there, nurse bees feed larvae the contaminated food which leads to contraction.

The spread of the virus is often quick within the larvae and will lead to eventual death. While the disease typically affects a few colonies within an apiary, beekeepers may also contribute to spreading the virus across even more hives during transportation and honey extraction.



Eradication

The good news to most beekeepers is that sacbrood is typically a minor inconvenience to a colony. In most cases the hive itself can overcome and eradicate the presence of the disease through no additional steps.

While the majority of SBV is recoverable, severe cases may require several steps for eradication. The only effective eradication method is to requeen the hive or relocate the entire colony to a non-infected site.



Prevention

Like many other diseases and infestations, risk of SBV

can be mitigated through responsible, hygienic apiary husbandry. In many cases the virus is accidentally spread across colonies by beekeepers themselves. This adds an even more profound risk when bees, queens and larvae are traded or shipped across the world.

Proper hive hygiene includes ongoing monitoring of colonies for the presence of sacbrood and other diseases or fungal infections. Additionally, regular sanitisation of hive equipment and tools can stop continual spread of the disease. Researchers also indicate water as a potential source of contagion for SBV. Accordingly, water sources should be regularly changed and containers sanitised. All of these steps should be especially considered if even a small number of the brood is positively identified with SBV.

Finally, maintaining a strong, well-nourished hive is always the most important step to disease prevention. A strong colony is exceptionally adept at eliminating diseases or other threats to their brood. Stressed or malnourished colonies lack the strength to fight off diseases such as SBV. By keeping hives robust and regularly monitored, beekeepers can significantly reduce the risk of SBV developing in their colonies.



Detecting Sacbrood in Your Colony

Beekeepers should recognise the distinction between sacbrood and other infections with similar symptoms. For instance, black queen cell virus (BQCV) also presents a sac-like appearance over affected pupae and larvae. However, BQCV only affects queen brood whereas sacbrood typically presents in worker bee pupae and larvae.

Additionally, sacbrood is often confused with the much more serious foulbrood infection. While both infections create sac-like growths on the larvae, colouring is often distinct enough to

differentiate the viruses. Foulbrood starts with an off-white colour, slowly changing to brown and black. Sacbrood starts off gray in colour, shifting to yellow before turning brown. Foulbrood is considerably more destructive to colonies so beekeepers should recognise all the identifiers to properly distinguish the two.

Beekeepers can also employ these additional detection methods:

YELLOW TO BROWN TO BLACK COLOURATION

Early stage infection is indicated with a pale yellow colour to the larvae. Advancing stages slowly

darken the larvae to a brown and even an almost black appearance after the brood is expired.

CAPPED OR UNCAPPED SEALS ON PUPAE WITH AN UNDEVELOPED HEAD

One of the signature signs of SBV is a sealed pupae shell with a small, pinhole-sized hole in the top. Additionally, uncapped seals can also present the larvae with an undeveloped head.

BRITTLE LARVAE IN DEAD OR ADVANCED STAGE INFECTION

A colloquial term for the dead larvae in a shell is a 'Chinese Slipper.' This is because of the shape and colour of the affected brood.

SOURCES

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<http://www.bees-on-the-net.com/beekeeping/bee-diseases/sacbrood/>
http://agriculture.vermont.gov/sites/ag/files/pdf/apiary/sacbrood_disease.pdf
<http://beeaware.org.au/archive-pest/sacbrood/>

BANNER PHOTOS ON PAGE 1

1. A closeup of the head of sacbrood virus killed larva. PHOTO: Prof. M.V. Smith
2. Infected larva in cell showing the change in colour and the mouth parts turning black and pointing upwards. PHOTO: UK Crown Copyright - courtesy of Fera
3. Perforated capped cells, inside larvae infected with sacbrood virus. PHOTO: Rob Snyder, www.beeinformed.org