

## Types of Honey Bee Viruses

### Acute Bee Paralysis Virus (ABPV):

This problem follows the Varroa Mite into the hive.

When the Honey Bee is injected with this virus it quickly kills the adult and pupa. The varroa mite can't complete its cycle and dies. This also causes the hive to dwindle and die.

### Deformed Wing Virus (DWV):

This virus allows the varroa mite to complete its life cycle. The hive will last one maybe two winters.

### Kashmir Bee Virus (KBV):

Transmitted only by the varroa mite. It will affect all bees, pupa as well as adult. Closely related to ABPV and IAPV. Moderate mite levels are sufficient to cause hive failure.

1. Shivering wings
2. Darkened and hairless thorax and abdomen.

### Israeli Acute Paralysis Virus (IAPV):

Transmitted only by the varroa mite. It will affect all bees, pupa as well as adult. Closely related to ABPV and KBV. Moderate mite levels are sufficient to cause hive failure.

1. Shivering wings
2. Darkened and hairless thorax and abdomen

There is the possibility that a combination of any of these viruses may cause CCD. It has not been proven.

### Black Queen Cell Virus (BQCV):

1. This virus affects the Queen pupae before it goes into the cocoon. The cells are sealed.
2. A tough sac-like skin is formed as the cocoon.
3. Upon death, the walls of the Queen cell will turn black.
4. The virus must be injected into the pupae.
  - a. Possible a varroa mite feeding on the pupae.
5. This virus is asymptomatic in the hive.
6. For the virus to work orally it will attach to the Nosema spores.
7. The seasonal prevalence follows Nosema.
8. The combination will kill the hive faster than Nosema.
9. It is not transmitted by Varroa Mites.

**Deformed Wing Virus (DWV):**

1. The varroa mite injects this virus into the Honey Bee.
2. The adult Honey Bee could have the virus but not the symptoms.
3. Once the mite problem is reduced the adult Honey Bee will start destroying the DWV.
4. Effects all stages of the brood.
5. The Honey Bees will have:
  - a. Early death of pupae
  - b. Deformed wings
  - c. Shortened abdomen
  - d. Cuticle discoloration in adult Honey Bees.
6. Winter mortality rate is associated with DWV.
7. Mites should be removed from the hive before winter.
8. DWV is a horizontal transmission.
9. DWV is found in:
  - a. Pollen
  - b. Feces
10. The Queen can transmit DWV through artificial insemination.

**Sac Brood Virus (SBV)**

1. Limited to spring increase in the hive.
2. Only effects the larva.
3. Effects adult bees asymptotomacly.
4. The SBV is started in the hypopharyngeal gland of the nurse bees.
5. And is feed to the larva through the infected royal jelly.
6. Once the virus starts with two-day larva it will continue to grow until the cell is capped.
7. The larvae fail to shed their skin during the molt.
8. This causes fluids to build up in the sack.
9. The sack starts to lose its SBV fluid after a few days.
10. If the sack is not removed from the cell it will form into a dark brown scale.
11. The brown scale will detach from the wall of the cell.
12. The infected SBV adult Honey Bees will start to forage sooner.
13. The Honey Bees prefer nectar gathering and will stop eating pollen.
14. This will reduce life span of the Adult Honey Bee.
15. The cause of the disease is the lack of food that brings on the virus.

**Slow Bee Paralysis Virus (SBPV):**

1. The virus effects two of the legs of the Honey Bee.
2. This virus has not yet been found in the US.

**Chronic Bee Paralysis Virus (CBPV):**

1. Type One – syndrome
  - a. Only seen in Great Britain
2. Type Two – Hairless Black Syndrome.
  - a. The Adult Honey Bees are black and shiny.
  - b. The hairs have fallen out.
  - c. They can fly.
  - d. The healthy Adult Honey Bees will try to push them out of the hive.
  - e. After several days, they will weaken and die.
  - f. The stronger hives are effected.
  - g. Several hives in an apiary could be effected while the others remain healthy.

**Apis Iridescent Virus (AIV):**

1. This virus has been found in Varroa Mites.
2. Not common in the US, but has been seen.
3. While working for the USDA in Egypt AIV was observed.
  - a. Once the hive was open the entire cluster had a glow about it.
  - b. The Egyptian beekeeper thought that it was normal.

Once the virus has entered the Honey Bee it will locate itself in the hemolymph.

Oral infection of viruses is almost impossible to stop.

**Two management procedures:**

1. Minimizing the risk of transmission
2. Reduce the viruses in the hive.

**Transmission of viruses:**

1. Look at the way you take care of your bees.
  - a. Separate infected colonies from healthy ones
  - b. Hive tools and clothing should be cleaned after working effected hives.
  - c. The extraction equipment should be cleaned on a regular basis.

**Apiary Management:**

1. Keep records. It helps with identify problems.
2. Separate apiaries by at least 2/3 of a mile.
3. Use unique color schemes so bees will return to their hive.
4. Keep apiaries small. This gives a better control of viruses.

**Colony Management:**

1. Inspect hives regularly
2. Keep logs
3. Mark the front of the hives with different color schemes. This will help with drifting.
4. Entrances should be reduced. This will help reduce robbing and with the control of the wasps.

5. Frame rotation:

- a. Bee bread contains a large number of viruses.
- b. Rotate frames every year. Complete rotation should take five years.
- c. It is better to rotate a full box of new frames than several frames. Less chance of viruses moving into several new frames.

Virus Load Management:

1. Viruses are found in all hives but low amounts.
2. Keep the hive healthy and stress free.
3. Minimal disturbance, movement and inspections.

Weak and diseased colonies are the likely hood of the source for viruses.

Viruses can attach to aphids when bees go after honeydew.

Viruses can be treated like bacteria and parasites.

Breeding:

1. The queen should be hygienic.
2. Consideration should be given to:
3. Hygienic behavior
4. Suppression of Varroa Mite
5. selection