KALRO
Kenya Agricultural & Livestock Research Organization

KCSAP
Kenya Climate Smart Agriculture Project

# Prevention and Management of other Honey Bee Diseases and Conditions

## Prevention and Management of other Honey Bee Diseases and Conditions

### Description

Various diseases infect bees in Kenya. Apart from European Foul Brood (EFB), Deformed Wing Virus (DWV) and Nosema diseases, there are other pathogens that infect bee colonies.

These include, but are not limited to:

1. Varroa destructor virus 1 (VDV-1)
2. Black Queen Cell Virus (BQCV)
3. Sacbrood virus (SBV)
4. Israel acute paralysis virus (IAPV)
5. Acute bee paralysis virus (ABPV)

Further, bees get other non-disease conditions such as diarrhoea, poisoning and colony collapse.

Bee diseases in Kenya are not as serious as pests. However, with increased beekeeping activities, disease challenges may increase. This is associated with increased domestication of bees, reduced swarming and increased bee populations, among others.

*Bee brood infected by sacbrood virus.*
*Photo courtesy of ©www.beeinformed.org/Rob Snyder*

## Economic Importance

Diseases weaken bee colonies, reducing their capacity to perform optimally, as well as making the bees more vulnerable to other stressors, both biotic and abiotic. Farmers in Kenya have not reported major challenges with bee diseases and conditions except once in a while.

## Predisposing factors to infestation

Various reasons make bees vulnerable to disease infections. Examples are:

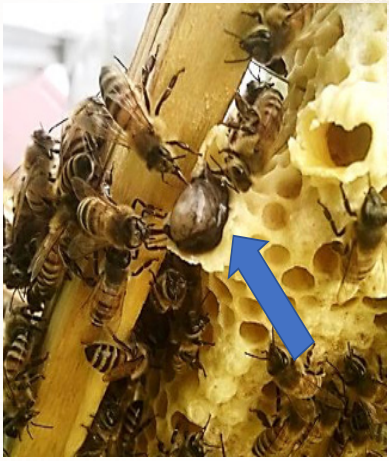
1. Robbing bees: Bees that move to other colonies to rob them of nectar or pollen. These bees can bring into the hive a pathogen if it is infected.
2. Lost bees: Sometimes bees find their way into hives that they do not belong to. If they are infected, they will spread the disease.
3. Weak colonies: These colonies become vulnerable to infections, are unable to clean hives or remove diseased bees and bee brood, hence contributing to increased loads of the infections.

## Signs and symptoms of infestations

The presence of varroa mites may provide signal that a possible infection by the VDV1

Sac brood disease expresses itself as punctured sealed (capped) cells with the infected maggots. You can observe scattered dead broad among healthy food. The cappings over dead maggots change in appearance from pearly white to dull yellow or grey and finally to black. Maggots die in a stretched-out position with their heads raised.

The BQCV is usually associated with Nosema disease, though there are usually no clear signs of this disease. It only replicates in maggots of the queen. It is expressed in form of the diseased maggot dying after cell cappings. The dead maggots are pale-yellow in appearance and are surrounded by a sack-like skin resembling sac brood infections.



*Black queen cell virus.*
*Photo courtesy of IZSLT/Giovanni Formato*

*Healthy queen brood Left) and queen brood infected by the BQCV.*
*Photo courtesy of Rob Snyder, www.beeinformed.org*

IAPV is a new virus largely associated with colony collapse disorder. The infected bees show 'shivering' wings, darkened hairless abdomens and thoraxes, which progresses into paralysis and death. Bees often die outside the hive.

ABPV virulence is directly associated with Varroa infestation. It is transmitted in larval jelly from asymptomatic infected adult bees to developing larva. Further, it can be transmitted through Varroa mites to larvae and pupae. The virus causes infections with no obvious symptoms

when transmitted orally from adult to the brood. The infected pupae die before emerging, which makes the appearance of paralysis symptoms less obvious.

*Arrow showing punctured cell capping. This happens when adult worker bees detect a brood disease. Photo courtesy of The Food and Environment Research Agency (FERA), crown copyright (arrows added for emphasis)*

**Prevention and control of the diseases**

- Maintain healthy and strong colonies, which are capable of defending themselves and removing dead broods and adults.
- Have frequent inspections to ensure early detection and removal of any infestations that may be found.
- Maintain good sanitation.
- Requeening colonies to strengthen their genetic diversity and productivity.
- Destruction of heavily infected colonies and sterilization of the hives before re-use.
- Avoiding transfer of brood combs across hives in the same apiary or different apiary unless you are sure they have no disease.

## Bee Health Conditions

### Dysentery

This is a condition which presents itself as diarrhoea/spotting on the hive. It is largely caused by the presence of excessive amounts of fluids in the bees' gut. Bees are unable to withstand waiting for the sanitation/

cleansing flight, necessitating bees to defecate anywhere in the hive. This condition is caused by Nosema disease, prolonged confinements, feeds with high water content and pollution.

*Dysentery on the front of a hive is a symptom but not indicative of Nosema disease.*
*Photo courtesy of Michael W. Wilson*

## Pesticide poisoning

This occurs through the use of pesticides in habitats where bees forage, e.g., in the crop farming, or acaricide effects for foraging livestock. Pesticides have lethal and/ or sub-lethal effects. Lethal effects affect foraging bees more and usually kill the bees in the field. Sub-lethal effects can go unnoticed and will have longer effects on the colony. In both cases, colonies become weakened and vulnerable to other stressors.

*Bee poisoning showing all the dead bees at the front of the hive.*
*Photo courtesy of Bryn Jones, Crop Pollination Association*

## Colony collapse disorder

This occurs when there is a rapid loss of adult worker bees in the affected colonies, resulting in weak colonies, which may end up dying. During scouting, there may be relatively more brood cells compared with adult worker bees. The loss of worker bees is not justified e.g., there are no noticeable dead worker bees in hives or the surrounding environment. There is also no noticeable stressor responsible for the adult bee loss e.g., the presence of pests and diseases.

## Prevention and management of bee health conditions

Various methods are used to reduce the stressors and their effects on the bees. These include:

**Apiary sanitation**: Ensure the cleanliness of the apiary; avoid disposal of hive materials such as propolis, combs and honey on the ground which bees collect and take to their hives.

**Hive inspection**: This will help identify the condition and the beekeeper can take appropriate actions. At least twice monthly will be a good interval for the inspections.

**Lobbying for justifiable use of pesticides**: Farming communities in beekeeping areas should be made aware of the negative effects of pesticides on bees. The community should also be guided on appropriate pesticides to use and the timing of use.

**Cleaning of affected hives**: Hives hosting bees that experience a certain condition should be cleaned and sanitized to avoid further colony effects.
**Keeping strong colonies**: Strong colonies are able to manage and withstand various stressors. If a colony is weak, it is advisable to re-queen or destroy it. The colony can also be given chance to regain strength, as long as the beekeeper keeps close eye on it to confirm it isn't the disease.

## Reporting

Beekeepers who suspect infections of their colonies should report immediately to the address below. Take representative images where possible and include the images in reporting the infections.

KCSAP Pamphlet No.

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Editorial and Publication coordinated by: Knowledge, Information and Outreach Unit