



Kenya Climate Smart
Agriculture Project

Prevention and Control of Varroa mites (*Varroa destructor*) in Bee colonies



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Description

Varroa mites are tiny red-brown external parasites of honey bees. They feed and live on adult honey bees, they mainly feed on bee hemolymph (bee blood) and reproduce on bee maggots and pupae in the developing brood, causing malformation and weakening of honey bees as well as transmitting numerous viruses. Heavy Varroa mite infestations cause scattered brood, crippled and crawling honey bees, impaired flight performance, a lower rate of return to the colony after foraging, a reduced lifespan, and a significantly reduced weight of worker bees.



Heavily infested worker bees in a colony. See the blue arrows for examples of the varroa mites. Many more bees are infested. Photo courtesy of Dr Muo Kasina

Detection

Varroa mites are mobile and spread easily within a hive. The adult mites attach themselves to adult bees or infest other honey bee larvae and pupae. Colonies become infected naturally if bees within the colony rob infected hives, or by honey bees drifting from infected colonies into non-infected colonies. Swarms and absconding colonies may also spread the Varroa mites within areas. Also, beekeepers can accidentally spread Varroa mites when infected combs or bee populations are placed in non-

infested hives or apiaries. Also, hive tools can spread the mites across hives during the inspection in an apiary.



Varroa mite under microscope magnification: normal posture (left) and underside (right). Photo courtesy of Dr Muo Kasina

If you suspect that you have varroa mites, a simple procedure can be done to check presence, as described below:

Test to detect varroa mite infestation in a colony using icing sugar



Diagrammatic description on the use of icing sugar to detect varroa mites in a colony. Photos courtesy of Dr Muo Kasina

The Test

1. Collect into a container some good number of worker bees. This can be done by holding the bar with worker bees and shaking into the jar.
2. Cover the jar well with a lid which is meshed
3. Pour icing sugar through the mesh to cover bees fully well
4. Shake the jar vigorously to ensure bees are fully covered with the icing sugar
5. After some few minutes, place the container upside down and continue shaking to remove the icing sugar, which already is with the varroa mites. Shake into a white background to help in observing the varroa mite
6. Collect the varroa mites using soft brush into a container and take photo for sharing with the experts
7. Return bees to the colony where you got them from
8. Destroy the contents after use. Avoid discarding to ensure no further transmission.

Predisposing factors

Varroa mites are external parasitic mites that feed on honey bees and their maggots, and cause significant damage to bee colonies. The following are some predisposing factors that may cause varroa mites to occur:

- Lack of genetic diversity: Honey bee colonies with low genetic diversity are more susceptible to varroa mites. This is because varroa mites are able to adapt to the genetics of their hosts and more easily reproduce and spread in colonies with a limited gene pool.
- Weak immune system: Honey bees with weakened immune systems are more vulnerable to varroa mites. This can be due to a variety of factors, including poor nutrition, exposure to pesticides, and other stressors.

- **Beekeeping practices:** Beekeepers who do not follow best practices, such as monitoring for mites and treating colonies when necessary, may inadvertently create conditions that are favourable for varroa mite infestations.
- **Environmental factors:** Environmental stressors, such as exposure to pesticides or other pollutants, extreme weather conditions, and habitat loss, weaken honey bee colonies and make them more susceptible to varroa mites.
- **Colony size:** Large honey bee colonies are more likely to have varroa mite infestations than smaller colonies, as mites can more easily spread and reproduce in larger populations.
- **Transport of colonies:** Moving honey bee colonies from one location to another can stress the bees and make them more vulnerable to varroa mite infestations.

It is important for beekeepers to be aware of these predisposing factors and take steps to mitigate them in order to prevent varroa mite infestations and promote healthy honey bee colonies



Nurse worker bees tending brood. Note the blue arrow showing the varroa mites while the orange arrow shows unsealed brood cells. Varroa mites will be transmitted into brood cells in such situations. Photo courtesy of Dr Muo Kasina

Economic importance

Varroa mites are a significant economic concern for beekeepers and the agricultural industry as a whole. Here are some reasons why varroa mites are economically important:

- **Reduced honey production:** Varroa mite infestations lead to a reduction in honey production, which can result in financial losses for beekeepers.
- **Loss of pollination services:** Honey bees are important pollinators for many crops, and varroa mite infestations weaken or kill bee colonies, resulting in a loss of pollination services. This can lead to reduced crop yields and lower profits for farmers.
- **Cost of control measures:** Beekeepers may incur significant costs in their efforts to control varroa mite infestations.
- **Risk of colony loss:** Varroa mite infestations can weaken honey bee colonies and increase the risk of colony collapse. The loss of a colony can have significant economic impacts, especially for commercial beekeepers.
- **Spread of diseases:** Varroa mites are known to transmit viruses to honey bees, and their presence in a colony lead to an increased risk of disease.

Signs and symptoms

Varroa mites are external parasitic mites that feed on honey bees and their larvae. Infestations of these mites can cause significant damage to bee colonies. These are some signs and symptoms of varroa mites' infestations:

- **Visible mites on adult bees:** Varroa mites are small, reddish-brown parasites that can be seen crawling on the bodies of adult bees. They are about the size of a pinhead and can be identified by their oval shape and eight legs.
- **Deformed wings:** Varroa mites cause deformities in the wings of adult bees, making it difficult for them to fly and forage for food.
- **Discolored or misshapen brood cells:** When varroa mites reproduce, they lay their eggs in the cells of the developing brood. As a result, the cells can become discoloured or misshapen.

- **Reduced honey production:** Varroa mite infestations cause significant damage to honey bee colonies, leading to reduced honey production.
- **Weakened or dying colonies:** If a varroa mite infestation is severe enough, it weakens or even kills an entire colony of honey bees.
- **Increased rate of virus transmission:** Varroa mites are known to transmit viruses to honey bees, and their presence in a colony leads to an increased rate of viral infections.

Prevention and control

Prevention and control of varroa mites are important for the health and survival of honey bee colonies. Here are some measures that beekeepers can take to prevent and control varroa mites:

- **Regular monitoring and scouting:** Beekeepers should regularly monitor their hives for signs of varroa mite infestations. This can be done by visually inspecting adult bees and broods, and by using sticky traps to monitor mite populations.
- **Hygienic beekeeping practices:** Keeping the hives clean and practicing good hygiene can help prevent varroa mite infestations. This includes regularly removing dead bees and debris from the hive and using clean equipment.
- **Genetic diversity:** Ensure strong colonies for purpose of having strong drones that mate available queens. This will ensure the addition of genetic diversity in the colonies. Sometimes trap strong colonies during swarming and introduce them into the apiaries.
- **Integrated Pest Management (IPM):** Using an IPM approach involves using a combination of prevention and control measures to manage varroa mites. This may include a combination of cultural, biological, and mechanical control methods.
- **Mechanical control methods:** Beekeepers can use mechanical methods, such as the use of screened bottom boards or drone brood removal, to control varroa mites.

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