

Varroa Mites: Beekeeper Enemy Number 1.

Samuel Ramsey and Dennis vanEngelsdorp*

University of Maryland, College Park

Corresponding author e-mail: dennis.vanengelsdorp@gmail.com

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Honey bees are dying. High rates of losses have been reported in Europe, North and South America, Asia, and Africa – virtually everywhere bees are kept. There are many theories about what the underlying cause or causes of these losses are; poor nutrition, pesticides, diseases and parasites are a few of the most commonly mentioned. While all probably play some role, either on their own or in combination, there is growing consensus that one – the parasitic varroa mite, plays a large, if not the largest, role in the high rates of colony mortality experienced in many places around the world.



Figure 1. Ventral view of adult female varroa mite.

Varroa mites (Figure 1) were originally a parasite of the Asian honey bee, but began to parasitize the European honey bee when European honey bees

were introduced to Asia in the last century. Since then varroa mites have spread to honey bee colonies in Europe in the 1970's and to United States in 1987. The mites are now established in all regions of the world except for small islands and Australia. Ten years after varroa's introduction in the US, these mites had nearly wiped out all the feral colonies in the US. Without management, varroa mites kill most colonies within a year or two. It is imperative that all beekeepers have varroa management strategies in place to prevent high losses in their operations.

Know your enemy: *Varroa* Biology.

Varroa mites are related to ticks. Like ticks, *Varroa* cannot complete their lifecycle without their host. Right before a worker or drone bee brood cell is capped, a female varroa mite crawls inside and hides in the brood food at the bottom of the cell. As the larvae transitions into a pre-pupa the female mite bites a small hole in its host's body. It feeds from that hole keeping it open so that her offspring can feed there as well. Like honey bees, mites can lay both fertilized and unfertilized eggs. Fertilized eggs become females, while unfertilized eggs become males. A female mite will first lay an unfertilized egg, and her son will then mate with his sisters as they reach maturity. A female mite will lay many eggs. While most will hatch, few will be fully mature when the adult bee emerges. Only those female mites that are fully

mature when the worker bee or drone emerges will survive. This is likely one of the reasons why varroa mites prefer drone brood – drone pupa take a couple of days longer to mature, so more of the mite's offspring will have time to mature and survive when the drone bee emerges. On average, a female mite will have just one surviving female offspring while the same mite infesting a drone cell will have twice as many surviving offspring. All male offspring and immature female mites will die when the bee leaves the capped cell. Feeding by the varroa mites on brood weakens the bees leading to smaller, shorter lived drones and workers. Feeding mites can also transmit viruses into their host. Deformed Wing Virus is one of the most common and easily identified of these viruses. Bees heavily infected with deformed wing virus particles often emerge as adults with non-functioning wings. While bees with overt symptoms of deformed wing virus die in several days, many bees can have low levels of infection and show no signs that they are sick. If beekeepers note high numbers of worker bees with deformed wing virus, they likely have very high varroa levels and need to put in place a treatment plan to reduce varroa mite populations right away.

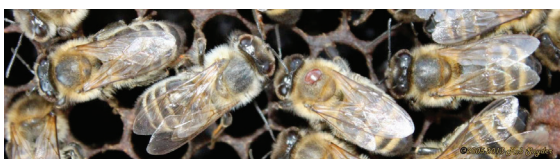


Figure 2. *Varroa* mite on thorax of a worker bee (center right).

While on adult bees, varroa mites appear to show a preference to attach to nurse bees, presumably because this makes it easier for them to find the right aged brood cell to invade and reproduce. When beekeepers examine frames of bees in heavily infested colonies they may see some mites on the top of thorax of some bees (Figure 2). However, most mites wedge themselves under the overlapping plates that make up

the bees abdomen (Figure 3). The only way beekeepers can know the level of infection in their colonies is to sample and test their mite levels. Instructions for how to quantify mite levels in a colony are found in a recent Varroa management guide that is free for download (Interactive Varroa Guide PDF).

As outlined in this guide, mite populations can increase quickly, doubling every month. Mite populations can climb from near undetectable levels to levels that are thought to harm colonies in several months.



Figure 3. *Varroa* mite's wedged underneath abdominal plates of a worker bee.

How bad are *Varroa* in managed colonies?

In the US, the National Honey Bee Disease Survey has been collecting samples from colonies across the country for over 5 years. Nearly every sample contained varroa mites, so other than a few beekeepers that live on some small Hawaiian islands, all US beekeepers should consider their colonies infested. The same is probably true in all other places varroa are present as well. Considering how wide spread varroa are it is worrying that less than half of small scale beekeepers (those who manage fewer than 50 colonies) treat for varroa. Untreated colonies will almost certainly die in a year or two. Sadly, deciding not to treat does not only affects colony survivorship in untreated operations; those decisions have a collective effect on all beekeepers. Choosing not to reduce populations of mites in small managed bee yards allows for mites to

spread to other colonies. Weak, untreated colonies are robbed by other bees. Robber bees return to their own colonies with mites and the virus complex associated with them. The decision of a nearby beekeeper not to treat reduces the effectiveness of your own treatments and management practices. There are many options available to beekeepers to help manage varroa mite populations. An excellent summary of management plans is freely available in the aforementioned Interactive Varroa Management Guide.

There is little doubt that varroa is beekeeper enemy number 1. All responsible beekeepers need to have a varroa management plan in place if they hope to keep their colonies alive. Even if colony survivorship is not a priority, managing mite populations is still critically important so that beekeepers don't negatively impact their neighbor's colonies. We don't let dogs or cattle walk around with untreated tick infections why should we think of bees any differently?

VARROA AKARLARI: ARICININ 1 NUMARALI DÜŞMANI

Bal arıları ölüyor. Avrupa, Kuzey ve Güney Amerika, Asya ve Afrika'da olmak üzere arıların bulunduğu her yerde yüksek oranlarda kayıplar kayıt edilmiştir. Bu kayıpların altında yatan neden veya nedenler ile ilgili pek çok teori bulunmaktadır; yetersiz beslenme, pestisitler, hastalık ve parazitler bunlar arasında en sık bahsedilenlerdir. Tek başlarına veya birlikte hepsinin büyük ihtimalle rolü bulunsa da, parazitik varroa akarının tüm dünyada görülen koloni ölümlerinde büyük rol oynadığı konusunda fikir birliği bulunmaktadır.