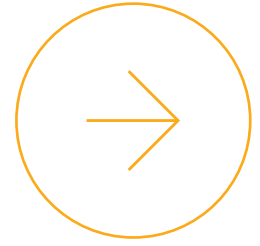


Varroa – bee health



Varroa destructor (varroa) poses a huge threat to bee health in Australia, particularly as a vector for viruses. In this factsheet, we outline the major health concerns caused by varroa and explain what we currently know about the situation in Australia.

After many years of successfully keeping varroa out of Australia, the pest is now at our doorstep. What effects does varroa have on bee health, and how does this tie in with the pests and diseases that beekeepers are already managing in Australia?

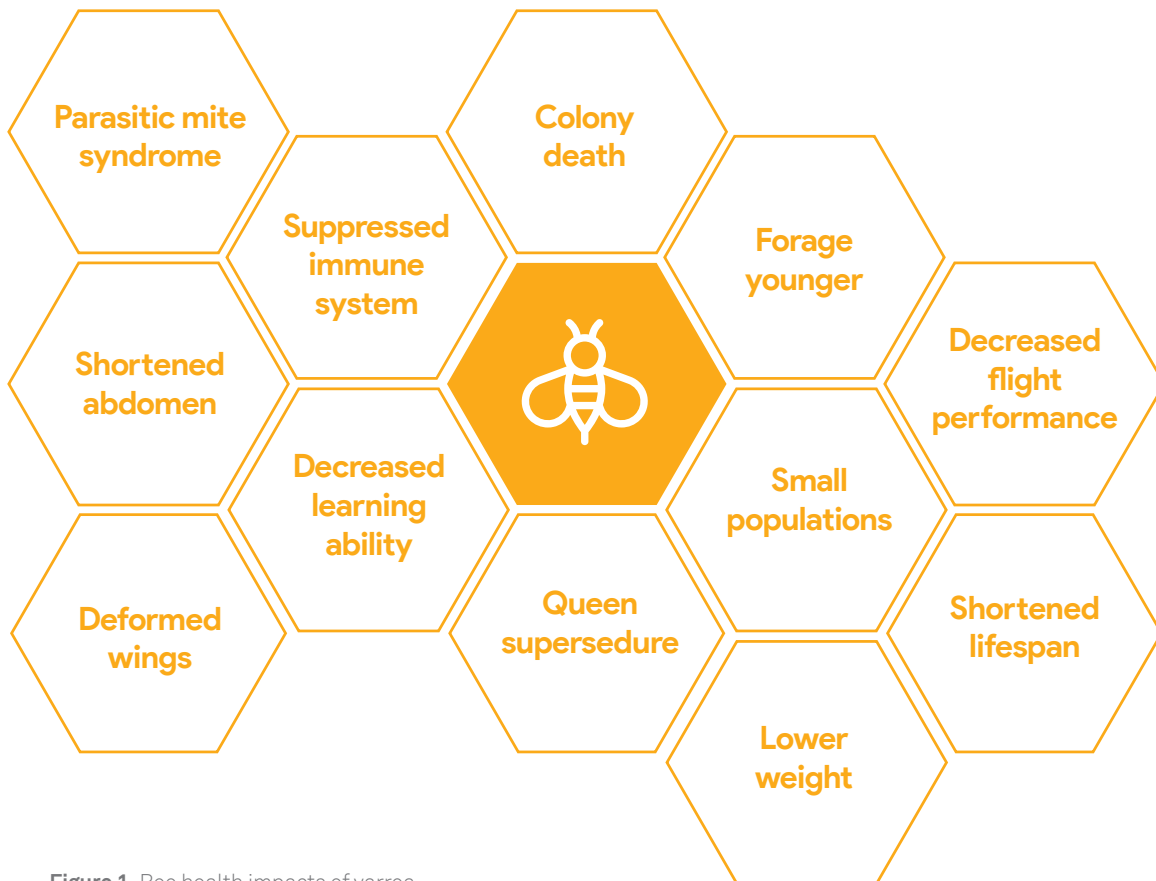


Figure 1. Bee health impacts of varroa



Learn more
www.agrifutures.com.au/honey-bee-pollination



AgriFutures[®]
**Honey Bee
& Pollination**

The mite bites

Varroa is an obligate parasite of honey bees, which means it cannot survive and reproduce without its honey bee host. Varroa mites bite into worker and drone brood, feeding on their fat stores. This has several health impacts for the bees: the adult bees weigh less on emerging from the cell, are smaller with shortened abdomens, have suppressed immune systems, start foraging earlier, have decreased learning ability and shorter life spans. While all of that is highly detrimental to individual bees and hives, the problem gets much worse once viruses are added to the mix.

Varroa and viruses – the perfect storm

There are many viruses that can affect honey bees. Usually, these exist as low-level background infections and beekeepers rarely notice any ill effects on the colony. However, once varroa gets involved, things change dramatically.

Varroa feeding spreads viruses from infected bees to uninfected bees i.e. it is a 'vector' for bee viruses, making the viruses much more deadly. Vectors help viruses infect more bees in less time, and the bees receive a higher dose of the virus when bitten by an infected mite. In fact, most honey bees can tolerate high levels of varroa infestation without major problems if the mites are not carrying viruses. Varroa and viruses have a synergistic relationship: they are less harmful to bees on their own, but when combined, they can cause a deadly syndrome from which colonies can rarely recover, even with help from beekeepers. Varroa and viruses combine to form 'the perfect storm'.

What should beekeepers look out for?

Varroa can act as a vector for several viruses. Overseas, when varroa arrived in an area there was a spike in the prevalence of common viruses like Sacbrood virus, Black queen cell virus and the Acute/Israeli/Kashmiri bee virus complex. However, these soon give way to be replaced by the most dangerous varroa-associated virus of all: deformed wing virus, or DWV.

Varroa infects larvae and pupae with DWV. When these bees emerge they have malformed, non-functional wings, bloated abdomens, paralysed bodies and significantly reduced lifespans. Once these symptoms start appearing at high prevalence in a colony, it is likely that the colony is suffering from parasitic mite syndrome (PMS), a condition from which few colonies can recover.

Deformed wing virus: the situation in Australia

Despite extensive surveys of honey bee viruses in Australia, DWV has never been detected here. While there have been occasional reports of DWV being detected overseas in samples exported from Australia, there is no evidence that the DWV originated here, and these samples may have been contaminated after being exported. This puts Australia in a unique situation: we may become the only place in the world that has varroa, but no DWV.

Many beekeepers around the world say that varroa management is really virus management, and that varroa is manageable if it is not spreading viruses. The impacts of varroa on Australian beekeeping will be much less severe if we can keep DWV out. All efforts must be made to ensure this remains the case.

Varroa and other honey bee pests and diseases

The most significant honey bee pests and diseases endemic to Australia are American and European foulbrood (AFB and EFB), chalkbrood, Nosema, and small hive beetle.

Unlike viruses, research from around the world has not found any evidence of significant interactions between varroa and these pests and diseases. Varroa does not vector brood diseases the way it does viruses. There is also no evidence of significant additional effects in colonies that have both varroa and small hive beetle.

Research into varroa's potential interaction with other pests and diseases is still ongoing. However, the important thing for beekeepers to remember is that if a colony is already weakened by a pest or disease, it will become far more vulnerable to infestation by varroa and any viruses it may be carrying. The reverse is also true: colonies weakened by varroa are more likely to succumb to other pests and diseases. Beekeepers should continue to manage these pests and diseases and ensure their colonies are in the best health possible. As well as disease management, this includes ensuring the bees are well fed, with adequate nutrition and water, and are kept in good quality hive boxes that reduce the spread of disease through drift and robbing. Healthier colonies are better able to cope with varroa and any other pest or disease.

Threats to bee health in Australia

If varroa establishes in Australia, the major threat to the industry will be DWV. As Australia is currently free of DWV, we need to make sure it stays this way.

Importation

Beekeepers may import genetic stock, either as live queens or as semen, to incorporate into their operations or breeding programs. This is becoming increasingly pertinent, as many breeders around the world claim to have developed varroa resistant stock that does not require treatment. However, the importation of honey bee stock from overseas poses the biggest risk for the introduction of DWV and other viruses.

Any potential importation of honey bee stock will need to be thoroughly screened to ensure it is free of viruses and other undesirable traits. Any benefits provided by importing stock

should be weighed against that risk. Imports should only come from reputable breeders with data to support the claims they make about their stock, e.g. low infestations, reduced or no chemical treatments, and increased colony survival.

Additional incursions

Australia has a world-class biosecurity system; we have been the only major beekeeping country that was free of the mite for the past two decades. Even if varroa becomes established here, this system must remain active. Additional incursions are always a threat, and should be prevented. A new incursion of mites has the potential to bring new viruses with it.

Additionally, there are other serious pests and diseases such as Tropiclaelaps mites that have not made it into Australia. We need to keep up our efforts to keep these pests out. The fewer pests and diseases present in Australia, the healthier our beekeeping industry will be.



References

Benoit *et al.* (2004) Mycoflora and fungal vector capacity of the parasitic mite *Varroa destructor* (Mesostigmata: Varroidae) in honey bee (Hymenoptera: Apidae) colonies. *International Journal of Acarology* 30: 103–106

Botías *et al.* (2012). *Nosema* spp. parasitization decreases the effectiveness of acaricid strips (Apivar®) in treating varroosis of honey bee (*Apis mellifera iberiensis*) colonies. *Environmental Microbiology Reports* 4: 57–65

Cornelissen & Neumann (2022) Invasive species require global efforts: COLOSS Task Force Small Hive Beetle. *Bee World* 99: 29–31

De Rycke *et al.* (2002) The possible role of *Varroa destructor* in the spreading of American foulbrood among apiaries. *Experimental and Applied Acarology* 27: 313–318

El-Seedi *et al.* (2022) Bee stressors from an immunological perspective and strategies to improve bee health. *Veterinary Science China* 9: 5

Gajda *et al.* (2021) Beekeepers' guide to honey bee viruses. *Bee Culture: The Magazine of American Beekeeping*. <https://www.bee-culture.com/bee-keepers-guide-to-honey-bee-viruses/>

Holmes *et al.* (2023) Resilient beekeeping in the face of *Varroa*. AgriFutures Australia, Wagga Wagga

Little *et al.* (2015) Associations among *Nosema* spp. fungi, *Varroa destructor* mites, and chemical treatments in honey bees, *Apis mellifera*. *Journal of Apicultural Research* 54: 378–385

Roberts *et al.* (2017) Absence of deformed wing virus and *Varroa destructor* in Australia provides unique perspectives on honeybee viral landscapes and colony losses. *Scientific Reports* 7: 6925

Taylor (2022). Final Report: Enhanced National Bee Pest Surveillance Program. Hort Innovation, North Sydney

Contacts

AgriFutures Honey Bee & Pollination team

For project-related inquiries:

Annelies McGaw

Manager, Levied & Emerging Industries
annelies.mcgaw@agrifutures.com.au
0407 987 738

Mia Lorber-Hughes

Coordinator, Levied & Emerging Industries
mia.lorber-hughes@agrifutures.com.au
0437 811 347

For industry and strategic issues and inquiries:

Amanda Olthof

Senior Manager, Levied & Emerging Industries
amanda.olthof@agrifutures.com.au
0499 384 037

Varroa support

This fact sheet is the second of a series to support beekeepers to manage varroa. Other tools will also be made available, including webinars and podcasts. You can find all these tools online at [AHBIC](#) and [AgriFutures Honey Bee & Pollination Program](#). AgriFutures Australia is working to support beekeepers in conjunction with industry.



Learn more

www.agrifutures.com.au/honey-bee-pollination



AgriFutures®
Honey Bee
& Pollination