

Tracheal Mites in Honeybee Colonies

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The Honeybee Tracheal Mite (HBTM) was first introduced into Canada in the late 1980s and has since spread to most of Canada's beekeeping areas. This microscopic mite parasitizes adult bees causing the weakening of the colony and increased winter mortality.

Field Diagnosis

- Disease caused by tracheal mites is called Acarine disease or Acariosis and has been named after its scientific name *Acarapis woodi* Oudemans.
- Tracheal mites can't be seen with the naked eye. Confirmation of infestation requires microscopic examination.
- Infected colonies are most likely to show signs of infestation in spring and fall when mite populations reach their peak.
- In cases of severe infestation, large numbers of adult bees crawl in front of the hive, incapable of flight and coordination. Many adults extend their wings outward, often described as "**K-Wing**". (This condition may be caused by K-Wing Virus ~KWV).
- Infected adult bees may be lethargic. Even on good days, a high proportion of bees are in the hive instead of flying.
- Colonies are slow in population build up in the spring and lack vigor. In the fall, a higher than normal proportion of the bee population dies before the onset of winter.
- Colonies show variability in their sensitivity to tracheal mites. Some colonies are resistant and unaffected by tracheal mites, while other colonies may be severely affected and collapse.
- After the introduction of Varroa mites, beekeepers have been applying Formic Acid which also controls tracheal mites. Tracheal mite infestations may have also declined as beekeepers have selected for tracheal mite resistant bee stock.

Collection of Bee Sample

- Randomly selected adult bees can be collected in the apiary and placed in alcohol water solution (50%). In case ethanol or rubbing alcohol (propanol) is not available, bees can be temporarily placed in windshield wiper fluid containing methanol.
- Tracheal mite infestations in an apiary are often un-equally distributed. As there are "hot spot" infestations in the apiary, it is recommended that each colony contributes an equal number of bees for the composite sample.
- A sample of bees from an apiary, regardless of the number of colonies, must contain at least 75 bees in order to detect a general tracheal mite infestation of 2.5 % or higher in the apiary, at 95% confidence (= 19 times out of 20).

Laboratory Diagnosis

- *Acarapis woodi* is an obligate, endo-parasitic mite infesting the tracheae or breathing tubes of adult honey bees.
- Using a dissecting microscope in the laboratory, adult bees are placed on their back, decapitated and the frontal section (collar) of the thorax removed to expose the major tracheae.

- Healthy, non-infected tracheae appear milky-white in color and almost transparent. Infected tracheae are mottled, sometimes bronzed in appearance, and with darkened patches. Higher magnification sometimes allows for the identification of adult mites.
- Light infestation generally involves one tracheal tube affected by mites (mono-lateral) while heavy infestation involves the damaged tissue of both tracheal tubes (bi-lateral).
- Since bees originated from different colonies, the testing results reflect only the condition of the apiary. Reading of these composite samples can only describe low or high infestations or “an apparent absence”.



Control and Treatment

- Before applying chemical controls, closely examine the colonies for signs of HBTM infection. Look for adult bees crawling in front of the hive, lack of vigor, display of K-Wing.
- When symptoms have been noted, a chemical control may be applied without having to collect bee sample for laboratory analysis first. Lab analysis is slow, labor intensive and expensive.
- In Canada, menthol and formic acid have been registered for control of HBTM. See **Factsheet #221** for application instructions.
- Apply chemicals **only** in spring or fall, with honey supers removed.
- Select for tracheal mite resistant bee stock, or purchase resistant stock from a bee breeder.
- Increased incidence and severity of infestation is worsened when bees are stressed. Stress factors may include presence of other diseases, poor forage availability, too many colonies placed in one location causing interference and robbing, lack of feed and pollen, poor beehive equipment, inclement weather, etc. Other preventative measures include: do not collect swarms whose origins are unknown; reduce movement of colonies and avoid high density areas; do not introduce colonies from infected areas or colonies that have not been tested into the beekeeping operation.