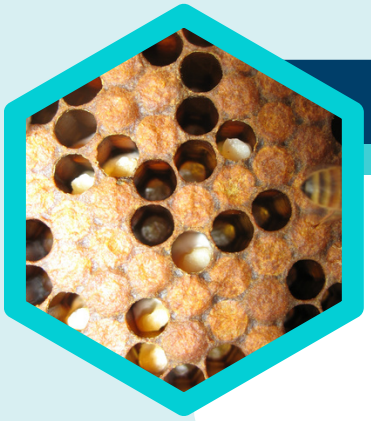
ALBERTA BEEKEEPERS COMMISSION
TECHTRANSFER PROGRAM

CHALKBROOD

Chalkbrood is one of the most common honey bee brood diseases and although not as aggressive as EFB or AFB, it can cause economic damage at high infestation levels. Chalkbrood is highly infectious, and spores can be spread through robbing, drifting of worker bees, and contaminated equipment. Each chalkbrood mummy can produce millions of infective spores which can stay in the environment for up to 15 years. These spores may stay contained in pollen, honey and wax.



WHAT IS CHALKBROOD?

It is a stress-related disease caused by a fungus, *Ascosphaera apis*, that infects honey bee larvae. This fungus causes the larvae to die within two days following the cell being capped. This can lead to the collapse of weaker colonies as brood production is limited.

SYMPTOMS

- Hard and dry chalk-like dead larvae called “mummies”.
- White, grey, or black mummies inside the cells.
- Mummies outside the hive entrance or on the bottom board.
- The anterior part of the bee that faces up becomes dry and pale yellow in colour.
- Spotty or “shot-gun” brood pattern in advanced cases.
- Small perforations in the brood cell cappings.
- Population decline.

CAUSES

Weaker colonies stressed by mites, bacterial and viral infections, and malnutrition are more susceptible to chalkbrood. Cool temperatures, often associated with high humidity, can also stress the larvae. Thus, outbreaks typically reach their peak in spring and early summer, a period when colonies are fast growing but still have relatively few adult workers to maintain consistent heat, ventilate the hive, and remove sick larvae.

IPM STRATEGY FOR PREVENTION

- Keep hives well ventilated and dry, and insulate in colder temperatures. Lower temperatures promotes mummification and high moisture triggers the fungus development.
- Inspect the hives periodically.
- Promote good foraging conditions by providing sugar syrup and pollen.
- Replace 20% of old brood comb annually to minimize spore loads.
- Select young queens bred for hygienic behaviour. Such behaviours passed down to her offspring will help remove low levels of infection.
- Control Varroa mite levels to increase colony strength against infection.

I HAVE CHALKBROOD, WHAT SHOULD I DO?

- There is no registered control product for use against chalkbrood in Canada or United States.
- If the colony is strong, the bees will often clean up the infection on their own.
- Remove mummies from the bottom board and around the hive entrance.
- Try to minimize the exchange of materials between hives (torching hive tools, frame exchange, etc.).
- Replace frames containing high chalkbrood to reduce the spore load in the hive.
- Requeen if infection is persistent or severe.

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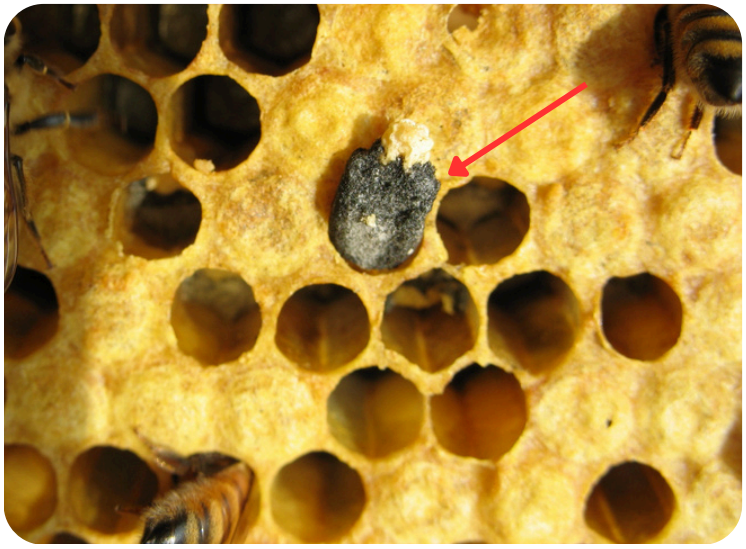
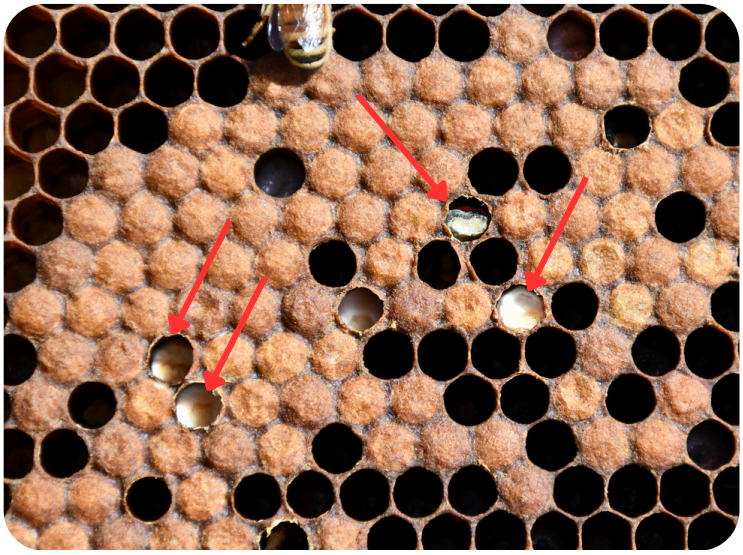
CHALKBROOD GALLERY

Infected mummies on **bottom board** of hive.



Mummies with a **black-grey** appearance indicate they are **spore producing forms**. **White** mummies **lack spores**.



Hard, shrunken and chalk-like mummies.

LIFE CYCLE

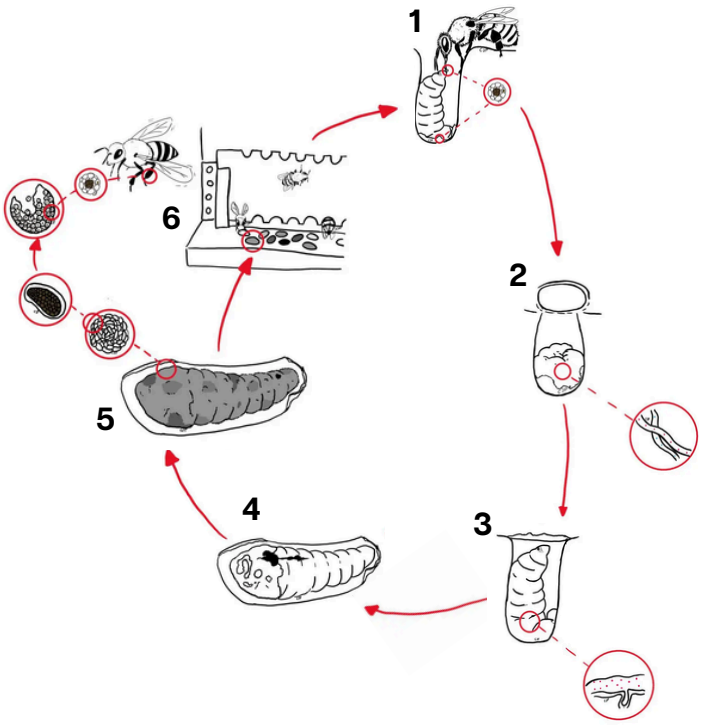


Image: Cecilia Panzetti
(Adapted by I. Bernsdorf).

1. The infection occurs through the ingestion of spores by young larvae. Adult bees may not be affected by the spores, they transmit them through feeding of each other and of larvae.

2. The vegetative growth of the fungus is halted until the larvae is completely sealed in the cell. In the meantime, the larvae will reduce its food intake.

3. When the larvae is 6-7 days old, fungal growth restarts within the larval body cavity.

4. The fungus eventually breaks through to the outside and kills the larva.

5. Over time, the larva becomes mummified, progressing from white with a yellow center to dark black. This dark colouration results from the formation of fruiting bodies, a special fungal structure which releases spores.

6. Foraging bees or contaminated equipment will carry the spores out of the colony and infect other hives.

Scan the QR Code for more information about *honey bee pests and diseases* or visit our website albertabeekeepers.ca/tech-transfer-program/

Resources

Agriculture and Irrigation. (2024). *Honey bee pests and diseases 2024.* Government of Alberta.

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