



Chalkbrood

Chalkbrood (*Ascosphaera apis*) is a mycosis (fungal disease) which infiltrates and spreads throughout a colony's brood.

Chalky-white in its early presence, the infection can quickly spread across a hive's larvae and cause significant damage if left unaddressed. Over time, chalkbrood mummifies sealed larvae and can kill a high number of the brood. The kill-off inevitably affects overall hive operations and decreases honey output. In many cases, this disease weakens the hive enough to allow other diseases or infestations to cause even more damage.

Symptoms

Symptoms of chalkbrood are often confused with other conditions or infections within a colony. Beekeepers should look for the following signs:

CHALKY-WHITE COVERING ON LARVAE

The telltale sign of chalkbrood infestation in its earlier stages is a cotton-like chalky-white material covering bee larvae. Filaments may be found evenly or sporadically across the larvae.

GRAY OR BLACK FUNGUS ON LATER-STAGE INFECTION

As the chalkbrood infestation worsens, the chalky-white colouration slowly changes to a gray or even a black appearance in later stages of the fungus.

MUMMIFIED LARVAE

Once the fungus has killed the larvae, it hardens them into a mummy-like appearance. In many cases these mummified larvae can be found in the hive entrance or pollen traps. Dead larvae is also typically found in the brood nest.



How it spreads

Initial contact with fungal spores typically occurs when honeybees are out collecting pollen. The bees introduce fungal spores into the colony and food, which the larvae then consume. Additionally, robber bees or poor colony husbandry may introduce the fungus into a hive. The fungus then grows in the gut of the larvae, eventually leading to visible signs in later stages.

Early stages of infection do not present any external symptoms on the larvae. However, larvae will typically expire within two days of sealing in their pupae. The disease itself will only spread through the larvae and there is no indication of ongoing spread in adult bees.



Eradication

Eradicating chalkbrood often boils down to maintaining a strong and vibrant colony. A robust population of bees is more resistant to fungal infections than weak or sparse hives. The ideal situation is to keep a colony strong so they can fight against a potential infection themselves.

In more severe cases, full replacement of comb frames may be necessary to guarantee full eradication of the disease. Many beekeepers recommend burning wooden frames that have been affected and replacing them with new ones.

In cases where the fungus has already caused significant damage, a requeening with a stronger brood and stock may be appropriate.

A high presence of the mummified larvae indicates the worker bees are not cleaning the hive appropriately. Beekeepers should remove the dried out larvae, clean

affected areas and requeen to develop a stronger, more resistant population.



Prevention

As mentioned, the strongest strategy against chalkbrood infection is preventative care and maintenance on the hive and the colony.

MAINTAIN CONTROLLED, SANITARY BEE HUSBANDRY

Aside from initial introduction into the colony, in many cases beekeepers themselves are responsible for spreading chalkbrood across their hives. High awareness of cleanliness, sanitation and cross-contamination can prevent the spread of the infection to other hives.

Beekeepers must remain aware of the equipment and tools being used — particularly if they suspect or confirm the presence of chalkbrood. Ongoing sanitation procedures and responsible husbandry are the best preventative measures any beekeeper can take.

KEEP HIVES WARM AND DRY (OR TEMPERATURE-CONTROLLED IN EXTREME CASES)

Chalkbrood tends to propagate most frequently in cooler, wetter environments. Accordingly, keeping the hive warm, dry and well-ventilated areas can also help prevent potential infection. This holds especially true in cooler seasons where positioning hives in sunnier locations is advised.

In cooler climate areas prone to high humidity, maintaining bees in a temperature-controlled environment will help reduce the risk of chalkbrood. This measure is typically only necessary in areas where continued infections occur despite other preventative measures.



Detection

Identifying the presence of chalkbrood in hives is fairly straightforward.

LOOK FOR HARDENED/MUMMIFIED LARVAE AT HIVE ENTRANCE

Dead larvae with a signature mummified presence are often found at the hive entrance. Visual inspection of these larvae often gives a telltale identifier for chalkbrood.

VERIFY CHALKY WHITE/GRAY/BLACK GROWTH ON BROOD

If dead and hardened larvae are found, presence of currently affected brood should also be identified. Checking larvae for the signature chalky fungal growth is the best way to confirm.

INSPECT POLLEN TRAPS FOR MUMMIFIED LARVAE

Dead and mummified larvae are also frequently found in a hive's

pollen traps. Beekeepers should also inspect these areas for the presence of affected brood.

CHECK THE PERIMETER OF THE BROOD NEST

Typical infection first occurs along the perimeter of the brood area. Beekeepers should first check the perimeter of the brood nest for the white or gray/black fungus. However, later stage infection can appear all across the brood area.

SOURCES

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<http://www.mda.state.mn.us/licensing/licensetypes/apiaryprogram/chalkbrood.aspx>

BANNER PHOTOS ON PAGE 1

1. Chalkbrood cell. PHOTO: Prof. M. V. Smith
2. Infected larvae. PHOTO: Prof. M. V. Smith
3. The entrance to a beehive littered with chalkbrood mummies that have been expelled from the hive. PHOTO: Jeff Pettis, Bugwood.org