

American Foul Brood Disease of Honeybees

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THE DISEASE

The American foul brood disease (AFBD) or American brood disease, is the most serious and infectious disease of brood honeybees. It occurs throughout the world and is responsible for considerable losses to bee and honey production. AFBD is a disease of young larvae, causing their death, the loss of hives and if uncontrolled, decimation of apiaries. Uncontrolled infected hives act as a source of infection to other hives.

AFBD is known to occur in most Australian States. The Northern Territory is thought to be free.

Suspected cases of AFBD must be reported to the Senior Field Veterinary Officer of your local primary industry department because it is a notifiable disease under the *NT Livestock Diseases Act 2008*.

Imported bees, used hives and equipment, raw honey, pollen and other apiary material must be accompanied by an interstate health certificate confirming freedom from AFBD. This is necessary for the protection of your hives and the industry.

CAUSAL ORGANISM

The bacterium *Paenibacillus larvae* var. *larvae* causes AFBD. This is a rod-shaped bacterium, which is visible only under a high power microscope. The rod-shaped bacterium is in the vegetative stage which rapidly multiplies in the larva, finally killing it. The bacterium enters a spore-form and as such it is highly resistant to desiccation, direct sunlight, heat, chemical disinfectants and antibiotics. Spores remain viable in hives, fittings and second-hand equipment for many years. Consequently they play an important role in facilitating the spread of the organism.

Infection takes place in the early larval stage during larval feeding. Death occurs after the capping of cells, in the late larval or early pupal stages. Larvae are susceptible in all seasons. Infection is not dependent on the nutrition or strength of the hive, or on the race of the bees being used.

SYMPTOMS

1. Colonies become progressively weaker.
2. Infected combs show distinctive characters, which are identifiable with AFBD. In a healthy comb, the arrangement of cappings is regular and they are bright, convex, uniform in appearance and generally unbroken. Heavily infected combs have an irregular arrangement of the brood over the comb. Capped cells are scattered giving what is often termed a pepperbox appearance. Cappings are concave, sunken, discoloured and may be perforated.
3. Larvae generally die after cells have been capped. The dead larvae are usually extended on the lower sides of the cells. Pupae may be affected only in the very early stage. After death, the larvae or prepupae progressively change colour through dull white, yellow, light brown, dark brown to finally almost black. The larva slumps to the lower side of the cell. Segmentation of the larvae disappears as decay proceeds. Body fluid thickens to a consistency that allows the decaying contents to be drawn out into a ropy thread. Finally a tough, coffee-coloured scale is formed as drying proceeds. It is usually on the lower walls of the cell and is difficult to remove. If death occurs in the pupal stage a 'tongue' protrudes upwards from the scale.
4. A characteristic pungent 'glue-pot' odour is readily noticeable, often as the cover of the hive is removed.

DIAGNOSIS

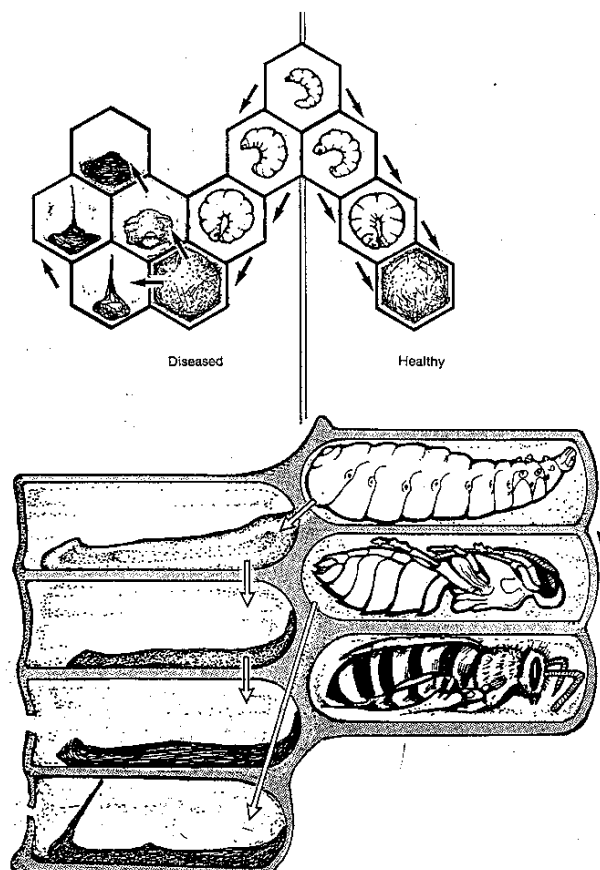
The apiarist should inspect hives at least twice a year because early diagnosis is essential for effective control. If AFBD is suspected, contact the Senior Field Veterinary Officer for a hive inspection or bring a suspect brood frame to the regional primary industry office. Samples will be taken for laboratory diagnosis.

TRANSMISSION OF THE DISEASE

AFBD can spread very easily unless care is taken by the beekeeper. Infected wild nests of bees in trees or walls will eventually die and will be robbed by other bees in the vicinity, thus transmitting the disease. Robbing and bee drift should be minimised to reduce the spread of the disease.

Interchanging of brood combs between hives and apiaries should be kept to a minimum. Second-hand bee equipment can remain infective for a long period, so it should not be used without rigorous heat sterilisation, e.g. inside of boxes should be charred with a blow-lamp and then scraped and painted.

Honey from unknown sources should never be used to feed bees. Second-hand honey tins should not be used if possible. If it is necessary, then bees should not have access to them.



TREATMENT OF INFECTED COLONIES

All contents of a diseased hive should be burnt and the hives themselves decontaminated as follows:

1. Diseased colonies should be destroyed in the evening when all bees are in the hives.
2. The entrance and other exit holes should be blocked. All bees in the diseased hive should be killed with 500 mL of petrol, which is sprinkled over the top frames.
3. A fire should be set in a pit of sufficient size to handle the number of colonies to be destroyed. The pit should be at a safe distance from hives treated with petrol.
4. Everything except the bottom-boards, hive bodies, extracting supers and top covers should be destroyed by fire. These parts are retained only if they are near-new and not cracked.
5. Debris from inside the hive should be scraped off and burnt. Undestroyed hives and hive parts should be sterilised by scorching all the inner surfaces and edges to a dark-brown colour with a blow-lamp. It is essential to repaint them.
6. The pit should be refilled and packed down.

Treatment of AFBD using therapeutic drugs is not permitted in the NT or in other States. The Australian honeybee industry is considering an eradication program.

ACKNOWLEDGEMENT

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