

Diseases of Honey Bees

... How to recognize
and control



Extension Circular 629

Revised August 1974

Extension Service
Oregon State University

Bee disease in an apiary can mean the difference between a good honey yield and none at all. It is imperative that all beekeepers be able to recognize the principle bee diseases soon after they appear so that adequate precautionary measures can be taken to prevent their further spread.

Diseases of Adult Honey Bees

Nosema

This disease is primarily of importance in the Pacific Northwest during the spring and early summer. It is caused by a protozoan *Nosema apis*, that lives in the mid-gut of adult bees, causing infected bees to die prematurely. Usually the disease symptoms disappear with the onset on hot, summer weather.

Symptoms: Worker bees can be seen wandering aimlessly about the entrance or in the grass near the hive. The abdomen of an infected bee is often distended and shiny in appearance. Many of the affected bees will have their wings spread and will tremble, often acting "drunk"; the majority will die in the field while foraging.

Control: Nosema can be arrested by feeding an infected colony sugar syrup containing the antibiotic fumagillin. Because this drug has no effect on the spores of the nosema parasite, this treatment will not completely eliminate the disease from an infected colony.

Fumagillin is the only drug approved by the Food and Drug Administration for the prevention and control of nosema disease. Fumagillin is available on the commercial market as Fumidil-B®.

Paralysis

Paralysis of adult bees is often confused with nosema disease, as the symptoms are similar. The disease is believed to be caused by a virus, and is most prevalent during the early spring. An infected colony is rarely destroyed and the disease usually disappears with the onset of summer.

Symptoms: Much like those of nosema disease. The bees tremble and have their wings abnormally spread. Often, the abdomens are congested and the bodies are virtually hairless.

Affected bees walk about in front of the colony, but are unable to fly. A large number will die in

front of the hive, and others will be removed from inside the colony by healthy workers.

Control: Requeen infected colonies from stock that shows resistance. Adding package bees from resistant hives will bring about a quick recovery.

Dysentery

This is invariably encountered in the late winter or early spring when bees defecate within the hive or at the entrance. It is usually a sign of poor-quality winter stores, of moisture leakage into the hive, or inadequate protection. Bees wintered out of doors with supplies of good quality will normally take to flight on warm, sunny, winter days. In such hives dysentery does not appear. Symptoms clear up as soon as the bees begin taking spring flights.

Brood Diseases

American Foulbrood

American foulbrood is considered the most serious and destructive of all bee diseases in the United States. A colony can very quickly be destroyed by this disease. It is caused by a spore-forming bacterium *Bacillus larvae*. Adult bees are not affected by this disease, but they can carry the infectious spores in their honey stomachs.

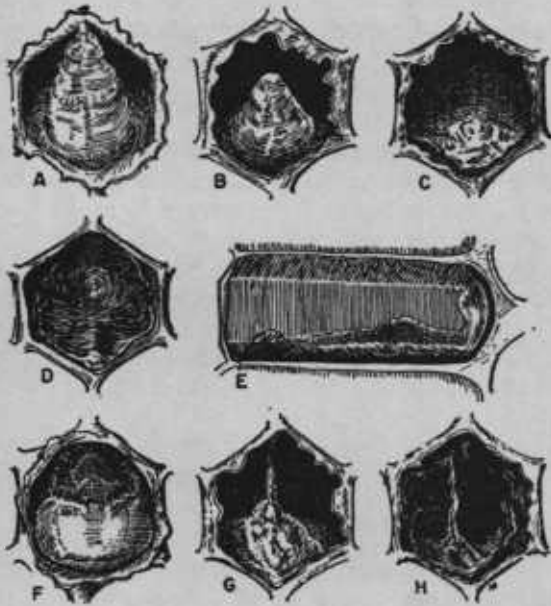
American foulbrood is spread through the interchange of infected combs, or by bees robbing the honey stores of colonies weakened by the disease. The spores can live in honey and infected equipment for years, but begin to multiply only when ingested by young larvae.

Control: Before purchasing any old equipment, make certain that each colony has a recent inspection certificate to insure its freedom from disease. Inspect the brood for disease each time an examination of the hive is made.

Prevent robbing by reducing the entrance to the hives, and do not expose suspected infected comb to robber bees.

There is only one sure way to control the disease. By law the bees, combs, brood, frames, and honey must be burned and the ashes buried. The hive bodies, covers, and bottom boards may be saved if they are scraped free of wax and honey and fire scorched to a depth of 1/8 inch. Soaking in a lye solution is an alternative method.

Honeybee Larvae Killed in Cells by AFB



A—Healthy larva at age when most of brood die of AFB. B, C—Dead larvae in progressive stages of decomposition. D—Scale. E—Longitudinal view of scale. F, G—Progressive stages in decay of honeybee pupae killed by AFB. H—Scale of dead pupa with tongue attached to top of cell.

Antibiotics have been used for years on American foulbrood with varying degrees of success. But antibiotics are not a cure and cannot kill the spore form of the bacterium. Often their erratic use masks symptoms of the disease, doing more harm than good. The best preventative against American foulbrood is sensible bee management in cooperation with beeyard sanitation.

European Foulbrood

European foulbrood is generally considered less serious in the United States than American foulbrood. The disease will rarely kill a colony but it will weaken a hive, resulting in lost honey production. The disease is spread in the same manner as American foulbrood.

Control: Requeening infected colonies with resistant stock is the best method for elimination of the disease. Adding package bees and supplemental feeding also help bring the infected colony back into production.

Sacbrood

Sacbrood is caused by a filterable virus. Little is known about the transmission of the disease. Sacbrood is another disease that rarely destroys

Comparative Symptoms of Brood Diseases

Symptom	American Foulbrood	European Foulbrood	Sacbrood
Appearance of brood comb	Usually sealed brood. Discolored, sunken, or perforated cappings.	Unsealed brood. Some sealed brood in advanced cases with discolored, sunken, or perforated cappings.	Sealed brood. Scattered cells with perforated cappings, often with two holes.
Age of dead brood	Usually older sealed larvae, or young pupae. Occasionally younger unsealed larvae.	Usually young unsealed larvae. Occasionally older sealed larvae.	Usually older sealed larvae. Occasionally young unsealed larvae, or young pupae.
Color of dead brood	Dull white, becoming yellow light brown to dark brown or almost black.	Dull white, becoming yellowish white to brown to almost black.	Greyish or straw colored, becoming brown or black. Head end darker.
Consistency of dead brood	Soft, becoming sticky or ropy.	Watery to pasty. Rarely sticky or ropy.	Watery and granular. Tough skin forms a sac.
Odor of dead brood	Pronounced glue-pot odor.	Slight to penetratingly sour.	None or slightly sour.
Scale characteristics	Brittle. Rough texture. Lies flat on lower side of cell. Adheres tightly to cell wall. Head flat. Fine, thread-like tongue of dead pupae adheres to roof of cell.	Tough and rubbery. Smooth texture. Usually twisted in cell. Does not adhere tightly to cell wall.	Brittle. Rough texture. Lies flat on lower side of cell. Does not adhere tightly to cell wall. Head prominently curled up.

an infected colony. A hive will most often recover from sacbrood without any assistance.

Control: No chemotherapeutic agent is effective in preventing or controlling sacbrood. Requeening colonies can often remove the infection.

Fungus Diseases

Brood diseases caused by fungi are not a major problem to beekeepers in the United States. Several recent outbreaks of Chalkbrood, causative agent *Ascosphaera apis*, have recently been reported in California, Minnesota, Montana, New York, and North Dakota. Stonebrood, caused by the fungi *Aspergillus flavus*, is similar in appearance to Chalkbrood.

Drone brood and recently sealed worker larvae are most susceptible to Chalkbrood. In both diseases the infected brood dries down to a mummified condition and often turns white in color, although the larvae can also appear gray or black.

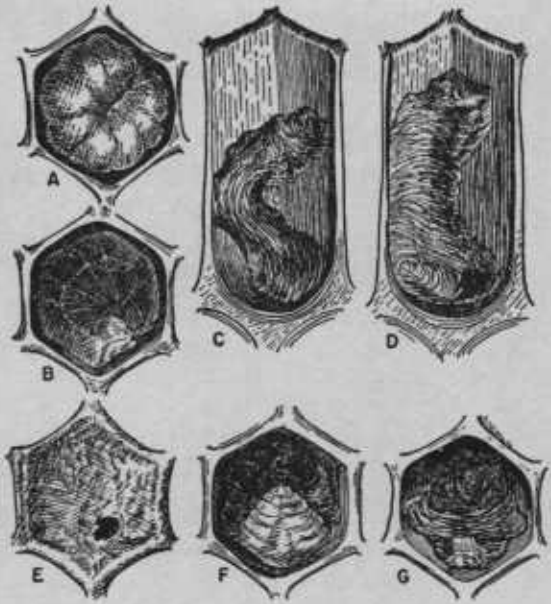
There are no known control measures. The symptoms will usually disappear during the summer as worker bees remove infected brood from the colony.

Apiary Registration

The State Apiarist or a local inspector visits as many apiaries as possible, searching for the diseases reported in this circular. Apiary inspection is a service to you, to prevent the spread of infectious diseases, particularly American foulbrood. Cooperation with these inspectors is to your benefit. The apiary inspectors have the responsibility of carrying out and enforcing provisions of the Oregon Agricultural Code which stipulate that colonies infected with American foulbrood be burned completely and the ashes buried.

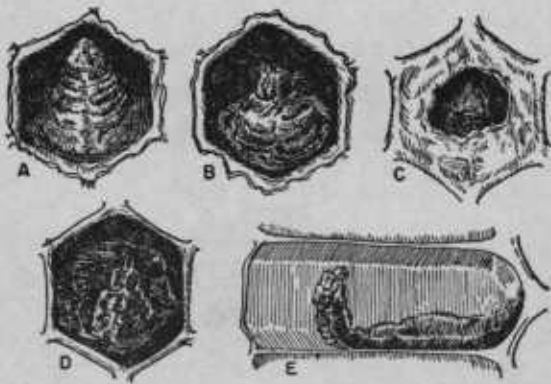
On or before April 1 of every year each beekeeper must register the colonies in his possession with the State Apiary Inspector. The fee is \$1.00, which includes registration for six or less colonies, plus 15 cents for each colony over six. This should be forwarded to the State Apiary Inspector, Department of Agriculture, Salem, Oregon. Funds collected from these fees are used to pay inspectors at the county level.

Honeybee Larvae Killed in Cells by EFB



A—Healthy larva at earliest age brood dies of EFB. B—One of several positions of sick larvae prior to death. C, D—Longitudinal views of scales from larvae that have assumed a lengthwise position prior to death. E—Sunken, perforated capping of the infected cell. F—Larva decomposing, lying lengthwise in the cell. G—Scale formed by dried larva.

Honeybee Larvae Killed in Cells by Sacbrood



A, B—Larvae in different stages of decomposition. C—Erect head of dead larva showing through an opening made by bees in the capping. D, E—Two views of scale; note erect position of head.

Disease Diagnosis

If you are unable to identify disease symptoms, forward a sample of the suspected diseased bees or brood to the State Apiary Inspector.

Chemical Residues

The Food and Drug Administration has not established tolerances for antibiotics in honey. No antibiotic or medication should be fed to honey bee colonies when there is danger of contaminating the honey.

This circular was prepared by D. Michael Burgett, assistant professor of entomology, Oregon State University.



OREGON STATE UNIVERSITY

**EXTENSION
SERVICE**

Extension Service, Oregon State University, Corvallis, Joseph R. Cox, director. This publication was produced and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Extension work is a cooperative program of Oregon State University, the U. S. Department of Agriculture, and Oregon counties.
