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Diseases of Bees: Their Detection and Treatment.

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Of the two kinds of foul brood, European and American, the European foul brood is by far the more prevalent in Connecticut. Both are contagious bacterial diseases of the brood, which may cause marked losses to beekeepers who fail to recognize their presence and give prompt treatment.

EUROPEAN FOUL BROOD.

This disease is caused by a germ known as *Bacillus pluton* which attacks and kills the growing larvae. It is very contagious and spreads with great rapidity. It appeared in Fairfield County in 1905, and later spread over nearly the entire state, completely destroying many apiaries. It has now been controlled and in many cases eradicated, though it needs the combined efforts of the inspectors and of all beekeepers to wipe it out.

SYMPTOMS: In this disease the larvae may die at any stage though a large percentage die before the cells are capped. Quite young larvae may be affected. The healthy larva is pearly white and lies curled around in the bottom of the cell. In the earlier stages of the disease the larva becomes slightly yellow and usually flattens out against the bottom of the cell. Most of the dead larvae are carried out by the bees; those left turn brown and dry up at the base of the cell. The decayed matter may sometimes be slightly ropy and have an odor.

TREATMENT: The shaking treatment combined with requeening the colony with a young Italian queen of good stock is the recognized treatment. Before beginning the work have all necessary supplies on hand ready for use. New hives, or old ones cleaned and disinfected, may be used. The frames should be nailed together and supplied with foundation. All weak colonies should be united so as to make fewer and stronger colonies, since it does not pay to treat weak colonies. All colonies should be treated during a honey flow, choosing a clear day when a large number of bees are in the field, but when there is no honey flow it is better to wait until night when the bees have just stopped flying. Remove the colony to be treated to one side, setting the clean prepared hive in its place. Shake or brush off the bees from the combs of the diseased colony into the new hive. After shaking each frame free from bees it should be placed in another hive or box and covered up to keep out robber bees. If the combs are not to be rendered into wax they should be burned at once. When diseased colonies have a large amount of brood at time of treatment, this may be placed together in a hive (after the bees have been shaken off), and set over a weaker diseased colony, or several hives of this brood may be tiered up with a few adhering bees. Care must be taken that no robbing from these combs occurs. Contract the entrance well. Later—say in two weeks—when the brood is mainly hatched, shake the same as a diseased colony. The bees may be shaken directly from the combs into the prepared hive, or in front on a sheet of paper or other cheap material adjusted as a temporary running board which can afterward be destroyed. In shaking directly into the hive, remove two or three frames and replace them after shaking. Make sure that you have not missed the queen, for, unless some precaution is taken, she may abscond. She can be caged in the hive for a few days, her wings can be clipped, or a guard can be put on the entrance. Always shade the hive and give a large entrance. After you are all through, clean up the yard and remove all old hives, combs, etc. Clean and disinfect the old hives or destroy them. Old combs lying about may be a source of infection for years if not destroyed. Hives can be disinfected easily in this way: Pile up several hive bodies on a bottom board, paint the inside surface with kerosene oil, fire it and let it burn until the surface commences to char, then throw in a small quantity of water and put on a cover to quickly extinguish the fire. If you have a gasoline blow torch, use that instead. Do not neglect to requeen as this is the important thing in the treatment of European foul brood. As this disease is usually found in black and hybrid bees requeening with a young Italian queen changes the colony to a race of bees that are nearly immune to European foul brood. The queen may be introduced at the time of shaking or soon after, though I prefer to wait and let the old queen start some brood before requeening.

Many colonies have been cured simply by requeening according to the Alexander treatment, which is briefly as follows:—Make all colonies strong, and kill their queens; in ten days destroy all queen cells and let the colonies remain queenless for twenty-one days; then introduce a

ripe queen cell or a virgin queen, or wait twenty-seven days and introduce a laying one. This treatment saves all the combs, and in the hands of a careful beekeeper is sometimes satisfactory. Some have good success in leaving the colony queenless only ten or twelve days.

Too much emphasis cannot be placed upon the importance of keeping pure Italian bees, of some strain as nearly immune to European foul brood as is possible to obtain; and keeping *strong colonies*. Then should the disease appear—though there would be small chance of it ever doing so—the following treatment would be comparatively easy: Remove the queen and allow the colony to remain queenless for a short time, or long enough to clean house; then introduce a young queen.

AMERICAN FOUL BROOD.

American foul brood is also a bacterial disease, caused by *Bacillus larvae*. Only a few apiaries are found infested each year in Connecticut.

SYMPTOMS: Most of the larvae are attacked just before and after capping of the cells. Nearly all of the larvae die after sealing, the cappings of the sealed cells have a sunken appearance, and many of them have holes eaten into them by the bees. At this stage the disease can usually be detected by the marked odor about the affected hives. The larvae turn light brown at first, and later become darker in color, when the dried scales adhere so tightly to the cell wall as to be removed with difficulty. If a toothpick be inserted in the dead larva and withdrawn, the decayed matter usually strings out an inch or more. Bees of an affected colony are much inclined to loaf and desert the supers on hot days; they leave the brood and cluster around the entrance.

TREATMENT: The shaking treatment already described for European foul brood is the best treatment for American foul brood. Some beekeepers shake the bees again in four days. If this is done, use any kind of a hive for the first shake—the old one will answer and it need not be disinfected. Then in four days shake again into a clean hive on full sheets of foundation, destroying all the combs built after the first shaking. Many good beekeepers object to shaking twice as it is apt to give the colony a serious setback. Colonies that are found to be diseased too late in the season for this shaking treatment can be cured, after brood rearing has ceased, by shaking the bees off their combs onto full combs of honey that are free from infection. Do not use this latter treatment for European foul brood, and do not use the requeening method for American foul brood expecting a cure. It does not pay to treat weak colonies for either kind of foul brood. Unless a colony is fairly strong it should be destroyed or united with another colony. After treating or handling diseased colonies, clean and disinfect hands, tools, etc.

SOME PRECAUTIONS.

Avoid feeding honey to bees, and never feed purchased honey. Feed sugar syrup instead. The purchase of combs and second-hand hives is dangerous. All hives should be thoroughly disinfected unless known to come from healthy apiaries. Never allow weak colonies to be robbed, and treat all hives where bees have died from unknown causes, the same as if they had died from foul brood.

SACBROOD OR PICKLED BROOD.

This is a disease of the larvae which causes death at about the time of capping. The larva is light brown, sometimes with a black head; its body is swollen, with both ends sharply pointed, and it usually lies on its back lengthwise of the cell. This disease is often mistaken for foul brood. It is not considered contagious or very serious in its nature, and usually disappears without treatment. The cause is not known.

BEE PARALYSIS.

This is a disease of the adult bee only. Often only a few colonies in an apiary will be affected. The diseased bees have a shiny appearance, and shake and stagger about, leaving the hive of their own accord or being expelled by the healthy workers of the colony. They drop at the hive entrance, often by hundreds, and are seen crawling on the ground until they die. The cause of the disease is unknown. Many remedies have been tried without success, but the best treatment is to remove the old queen and introduce a healthy young one.

ISLE OF WIGHT OR NOSEMA APIS DISEASE.

This disease of the adult bee somewhat resembles paralysis and has been very destructive in England and the Isle of Wight. It is now thought to be present in this country, though it has not as yet been so destructive as in England. The disease here makes its appearance suddenly, often disappearing as suddenly. Sometimes every colony in the apiary is affected and large quantities of dead and dying bees can be seen on the ground in front of the hives. No cause or remedy is known for this disease.