

American Foulbrood Fact Sheet

American Foulbrood Cause

Bacillus larvae, a microscopic spore-forming bacteria.

Healthy Capped Brood



Effect

American foulbrood (AFB) is the most widespread and the most destructive of the brood diseases. At first, the strength of an infected colony is not noticeably decreased and only a few dead larvae or pupae may be present. The disease may not develop to the critical stage when it seriously weakens and finally kills the colony until the following year, or it may advance rapidly and seriously weaken or kill the colony the first season.

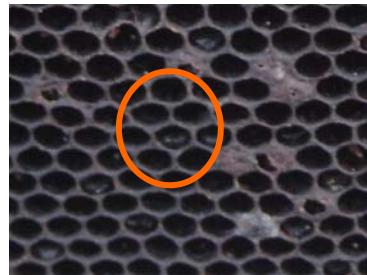
Infected Capped Brood / Roping



Symptoms

Death of an infected larva usually takes place after the cell has been sealed and the cocoon has been spun. First, the **capping of the diseased cell becomes moist and darkens in color**. Then as the larva shrinks, the capping is drawn into the mouth of the cell so the **convex capping becomes concave**. Worker bees may puncture this sunken capping and may eventually remove it altogether. At death, the diseased larva changes from a **normal pearly white color to a creamy brown, then gradually darkens**. These larval remains can be drawn out into a **brown thread or rope**. As the larva dries up, it becomes dark brown. **The final state is a very dark brown, rather rough scale that lies uniformly on the lower side of the cell** and extends from just below the mouth of the cell down to the base. **These scales stick very tightly to the cell and can be removed only with great difficulty**.

AFB Scale



If death occurs at the pupal stage, the tongue of the pupa (false tongue) protrudes from the scale across the cell. The odor of dead brood is very characteristic and has been described as resembling a glue pot or glue color. The overall appearance of a comb infected with American foulbrood is patchy (pattern referred to as "shotgun") because of the intermixed diseased and healthy cells and also because the remains vary from the ropy moist larvae in cells with dark sunken or perforated capping to the dry scales lying in open cells whose cappings have been chewed away completely by the bees.

Transmission

The spores are fed to young larvae by the nurse bees. They then germinate in the gut of the larva and multiply rapidly, causing the larva to die soon after it has been sealed in its cell. By the time of death of the larva, the new spores have formed. When the house bees clean out the cell containing the dead larva, these spores are distributed throughout the hive and more and more larvae become infected. The honey in an infected colony becomes contaminated with spores and can be a source of infection for any bee that gains access to it. For example, as a colony becomes weak, it cannot defend itself from attacks by robber bees from strong nearby colonies; **these robbers take back the contaminated honey to their own colony** and start again the cycle of infection and robbing. The beekeeper also may inadvertently spread the disease by exposing contaminated honey to other bees or **by interchange of infected equipment**. Using stored equipment contaminated by spores will lead to a new infection even after years of storage. Moreover, drifting bees or swarms issuing from an infected colony may spread the disease.

Control

Sanitation and elimination of disease reservoirs is a necessity for adequate control of American foulbrood.

Traditional control measure is to kill all bees in an affected colony and then destroy bees and their comb by burning. In some cases, minor infections may be treatable, so contact the State inspector. Bees wax is very volatile when placed in a fire. You must be careful burning diseased bee equipment. In New Jersey, you need a burn permit to legally do this (see attached sheet) The hive bodies, bottom board and covers can be salvaged if they are in good repair by scraping thoroughly and then charring the inside portions and/or boiling in a lye solution.

Shaking - In the spring and early summer you may shake the bees into clean equipment with no drawn comb only foundation. The bees will metabolize the spores when they produce comb. The diseased equipment must be burned. Re-queening with a hygienic queen is recommended.

Medicating - Drug treatment suppresses development of the AFB pathogen. However, treatment does not destroy spores. The drug oxytetracycline (Terramycin) applied as a dust helps prevent the spread of AFB in an infected apiary or in an infected area. No drug should be fed when there is danger of contaminating the honey crop. Follow the directions carefully and do not overdose. Remember that spores may and often do survive feeding of these drugs and colonies may break down with disease when treatment is terminated. Terramycin Soluble Powder is used for the prevention of European and American foulbrood. This product is available in a 6.4-oz packet. The package directions can be confusing; to determine the correct application amounts, follow these directions:

- Each 6.4-oz package contains 50 treatments, so mix one package with 50 oz (just over 3 lbs) of powdered sugar. Store in a tightly sealed container. (Exposure to air or moisture will break down Terramycin.)
- The dosage per colony is 2 tablespoons of this mixture, given three times, 4–5 days apart (for a total of 600 mg per colony). Spread two tablespoons of the Terramycin mixture over the end of the top bars in the hive body with the most brood. Preventative treatments can be applied to colonies in the fall after honey supers are off, and again in the spring **45 days** before putting honey supers on. Premixed Terramycin formulations:

Terra Brood Mix® (Mid-Con)

Tetra Bee Mix® (Dadant)

Terra Pro® (Mann Lake)

Terra Brood Mix or Tetra Bee Mix.

These products are identical. This is premixed Terramycin and is used for the prevention of American and European Foulbrood. It takes the guess-work out of how much Terramycin and sugar to mix together. For both products, the dosage is 2 tablespoons, three times, 4–5 days apart. Spread the Terramycin mixture over the end of the top bars in the hive body with the most brood in it. Treat colonies in the fall after honey supers are off and again in the spring at least 45 days before putting honey supers on.

If you have any further questions, if you need an inspection or are not sure about what you are seeing, please contact New Jersey State Apiarist Tim Schuler **609-462-7820** or
tim.schuler@ag.state.nj.us.

Procedure for Bee Keepers to obtain an Open Burning Permit

For the clean up of a honey bee colony infested with (AFB) American Foulbrood *Paenibacillus larvae*

Fill out a NJDEP Forest Fire Service Application for Open Burning Permit – NJAC 7:27-2.1 ET Seq.

This permit application is available from the Bee Inspector, or from your Forest Fire Service Regional Division office.

The type of permit requested is **infested plant life**. The Forest Fire Service and the DEP Compliance and Enforcement Division have agreed to this designation.

Mail the permit, a copy of your inspection certificate report (from Bee inspector) with a **check for \$10.00, to the appropriate division office.** (found on the back of the application) They will process the application and send you the permit with instructions.

3. The day of the burn,

Call the listed phone numbers on the permit (or instructions) during *normal business hours* to make notifications as to date, time, location and permit number of the burning. This list may include;

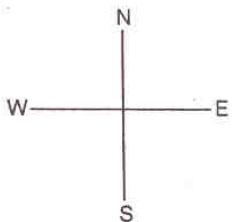
The Forest Fire Service Division office **or**;
The local Firewarden and;
Your local police/fire dispatch (Use the non emergency number in phone book)and;
The County Health Department (number in phone book)

- b. **Notifications must be made prior to a weekend or holiday for the permit to be valid**
- c. Kill the bees
- d. Dig a hole about 1 foot deep by 3 feet in diameter. Pile the dirt around the hole in a circle.
- e. Have a water source nearby if possible, a rake and shovel.
- f. Don't burn the whole hive at one time. Bees wax is very flammable and you are responsible to keep control of the fire. Take a few empty frames, some newspaper and a hive body or super to start with. Get the fire going, and add more frames and wooden ware as needed **to keep control of the fire**.
- g. **Plastic Hive components may not be burned**; they must be double bagged, sealed (Bee Proof) and disposed in a proper way.
- h. When the whole hive is consumed then cover the hole with the dirt.
Make sure there is no chance of the fire escaping the hole. Douse with water as conditions require.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
FOREST FIRE SERVICE**APPLICATION FOR OPEN BURNING PERMIT - NJAC 7:27-2.1 ET SEQ.****TYPE OF PERMIT REQUESTED** (Check appropriate box)

INFESTED PLANT LIFE HERBACEOUS ORCHARD PRUNINGS AGRICULTURAL LAND CLEARING

PLEASE READ INSTRUCTIONS ON REVERSE SIDE BEFORE COMPLETING

| | | |
|---|--|---|
| A | | 1. FULL NAME (BUSINESS) _____ 2. COMPLETE MAILING ADDRESS _____ 3. HOME PHONE NO. _____ DAYTIME PHONE NO. _____ |
| B | | MUNICIPAL RESTRICTIONS ON OPEN BURNING <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, PLEASE EXPLAIN _____ |
| C | | INFESTED PLANT LIFE ONLY NATURE OF INFESTATION WITH SCIENTIFIC NAME _____ I HEREBY CERTIFY THAT THE PLANT LIFE DESCRIBED HEREIN IS INFESTED <i>SIGNATURE OF AUTHORIZED AGENT</i> AUTHORIZED AGENT: RUTGERS COOPERATIVE EXTENSION SERVICE OR COUNTY AGRICULTURAL OFFICE |
| D | | HERBACEOUS PLANT LIFE; ORCHARD PRUNINGS AND CULLINGS; AND AGRICULTURAL LAND CLEARING AND HEDGEROW REMOVAL THIS TYPE OF PERMIT MAY ONLY BE ISSUED FOR <u>COMMERCIAL FARMING AND/OR RELATED AGRICULTURAL OPERATIONS</u> . TYPE OF COMMERCIAL FARMING OPERATION: TOTAL FARM ACREAGE _____ <input type="checkbox"/> RAISING FOOD CROPS <input type="checkbox"/> RAISING SALT HAY <input type="checkbox"/> ORNAMENTALS (Nursery) <input type="checkbox"/> OTHER (Please explain) _____ |
| E | | AGRICULTURAL LAND CLEARING ONLY: TOTAL ACREAGE TO BE CLEARED _____ |
| F | | 1. LOCATION OF BURNING: COUNTY _____ TOWNSHIP _____ 2. SKETCH EXACT AREA WHERE BURNING IS TO BE CONDUCTED, INDICATING DIRECTION AND DISTANCE TO NEAREST ROAD, INTERSECTIONS, STRUCTURES, ACCESS ROADS AND OTHER GEOGRAPHICAL FEATURES.  |
| G | | MOST RECENT OPEN BURNING PERMIT #: _____ (if applicable) OTHER NAME/BUSINESS NAME YOU HAVE BEEN ISSUED AN OPEN BURNING PERMIT UNDER: _____ (if applicable) DATE YOU WOULD LIKE TO BEGIN BURNING UNDER THIS PERMIT: _____ I CERTIFY THAT THE INFORMATION CONTAINED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE. DATE OF APPLICATION _____ <i>SIGNATURE OF APPLICANT</i> |

GENERAL INSTRUCTIONS

FEES: Applications for open burning permits pursuant to the provisions of NJAC 7:27-2.1 et seq. shall be accompanied by a service fee in accordance with the following schedule and no permit will be issued until the appropriate fee is received by check or money order payable to the "New Jersey Forest Fire Service". The amount received will indicate the term of permit desired. Upon a finding of ineligibility, checks will be returned. However, any misrepresentation or use of permit for other than stated purpose will result in the cancellation of permit and forfeiture of application fee.

| | | |
|--|-----------------|--|
| 1) INFESTED PLANT LIFE | 30 DAYS OR LESS | \$10.00 |
| 2) HERBACEOUS PLANT LIFE | 7 DAYS OR LESS | \$10.00 |
| | TO 90 DAYS | \$25.00 |
| | TO 1 YEAR | \$50.00 |
| 3) ORCHARD PRUNINGS AND CULLINGS | 7 DAYS OR LESS | \$10.00 |
| | TO 90 DAYS | \$25.00 |
| | TO 1 YEAR | \$50.00 |
| 4) AGRICULTURAL LAND CLEARING AND HEDGEROW REMOVAL | 90 DAYS OR LESS | \$25.00 MINIMUM PLUS \$1.00/ACRE TO \$50.00 MAXIMUM. (e.g. 10 acres \$25.00 + \$1.00/acre = \$35.00 fee) |

INFESTED PLANT LIFE - Certification by authorized agent in Section C required.

AGRICULTURAL LAND CLEARING AND HEDGEROW REMOVAL - In addition to fee, a NOTARIZED AFFIDAVIT is required, declaring that land cleared as a result of open burning will remain in agriculture for a period of 5 years following expiration date of permit. Violation of this provision subjects the offender to a fine up to \$2,500 per day. There is a maximum allowable clearing of 25 acres per year. Only one Agricultural Permit may be issued per calendar year. Land clearing by open burning will not be permitted near or within sensitive air quality regions because of mandates of the Federal Clean Air Act (within 4 miles of Brigantine Wildlife Refuge and Metropolitan North Jersey). Please check with appropriate division office concerning extent of these areas.

All categories of permit are subject to inspection by the Forest Fire Service to determine eligibility.

Submit original with required fee to appropriate division office:

DIVISION A

COVERING Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Somerset, Sussex, Union, Warren Counties, Hopewell Twp., Mercer County and Middlesex County north and west of the Raritan River/Canal of Raritan

DIVISION B

COVERING Burlington, Monmouth, Ocean Counties and Middlesex, Mercer and Somerset Counties south of the Raritan River

DIVISION C

COVERING Atlantic, Cape May, Cumberland, Gloucester, Salem and Camden Counties

N.J. Forest Fire Service
240 Main Street
Andover, NJ 07821
973-786-6350

N.J. Forest Fire Service
P.O. Box 239
New Liston, NJ 08064
Phone: (609) 726-9010

N.J. Forest Fire Service
5555 Atlantic Ave.
Mays Landing, NJ 08330
Phone: (609) 625-1121

FOR OFFICIAL USE ONLY

PERMIT # _____

CHECK MONEY ORDER
 CASH - Receipt No. _____

AMOUNT _____

ISSUE DATE _____

EXPIRATION DATE _____