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EFB (European Foulbrood)

Summary

La loque europea es una enfermedad bacteriana que afecta a la cría de abejas. La resistencia genética de algunas especies de abejas a esta enfermedad puede permitir, especialmente en condiciones ambientales favorables, superar la infección sin sufrir daños graves. Sin embargo, debe señalarse que, aunque se caracteriza por un mejor pronóstico de la loque americana, en algunas zonas, la loque europea tiene una manifestación más maligna, dañando seriamente también colonias de abejas muy fuertes.

Esta práctica describe las causas y los síntomas de la loque europea, como se propaga la enfermedad y como abordar y prevenir la enfermedad.

Description

CAUSA S

La loque europea es causada por la bacteria streptococcus *Melissococcus pluton* (*M. pluton*), a menudo asociada con otros agentes bacterianos, incluso: *Bacillus alvei*, *Streptococcus faecalis*, *Achromobacter eurydice*, *Paenibacillus alvei* y *Bacillus laterosporus*. Dependiendo del tipo de bacterias asociadas con la bacteria *M. pluton*, la loque europea puede ocurrir con diferentes síntomas (por ejemplo, la presencia / ausencia de un olor desagradable ácido).

M. pluton es una bacteria que es bastante resistente a condiciones ambientales adversas (por ejemplo, permanece viable durante varios meses en el polen).

TRANSMISION

La bacteria se desarrolla en la colmena a nivel de cría. Esta enfermedad se propaga por vía oral en la colmena por las abejas nodrizas que, en el intento de limpiar las celdas de las larvas muertas, se contaminan con las esporas y las transmiten a la cría cuando van a alimentarla.

La enfermedad puede ser transmitida de colmena a colmena o de apiario a apiario por las abejas (especialmente cuando las abejas roban una colmena enferma) y por el apicultor (con el uso de miel infectada para alimentar las colonias sanas, moviendo colonias enfermas durante la apicultura trashumante, con el comercio de herramientas infectadas, el uso de equipos contaminados, trasladando panales de una colmena a otra, etc.).

La enfermedad, mientras que puede ocurrir durante todo el año, es más común en la primavera cuando hay más cría. La bacteria se puede propagar a través de la miel con panales infectados (a través del polen, miel, cría, etc.).

El desarrollo de la loque europea puede ser favorecido por un desequilibrio entre el número de las larvas y lo de las abejas nodrizas. Además, la loque europea parece ser más común en las primaveras frías y lluviosas, cuando puede haber escasez de alimentos, especialmente de proteínas para la cría (falta de polen). También se ha observado que la calidad y cantidad de las fuentes de néctar y polen son capaces de influir en el curso de la enfermedad.

El estado de salud de la colonia es muy importante para el desarrollo de la enfermedad en la colonia: colonias débiles o colonias que están estresadas por cualquier motivo (escasez de alimentos, apicultura trashumante, pesticidas, etc.), así como colonias genéticamente más sensibles son especialmente propensas a esta enfermedad.

Colonias sanas y fuertes serán capaces de recuperar de la enfermedad por sí mismas si la temporada garantiza fuentes de alimentos adecuadas (polen, néctares y flores).

SYMPTOMS

The transmission of EFB from the adult bee to the larva takes place orally. After the infection, the larvae die in a few days (regardless of whether the larvae are working bees, drones or queens). Unlike the American Foulbrood, *M. pluton* kills the larvae before the cells' capping.

The death of the larvae occurs with open cells and this is one of the features that allows to differentiate the EFB from the AFB (Fig. 1). Only in the case of serious infection with EFB, the larvae can die in capped cells.



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Fig. 1: Larval death with open cells

Another important feature useful to recognise this disease, is that the affected larvae instead of being horizontally positioned on one side in a C-shape, adhering to the back of the cells, they often change position.

The infected larvae initially lose their pearly white colour to become first opaque, then yellowish and finally yellowish-brown (Fig. 2). After death, the larva becomes darker and decomposes, turning into a soft brown mass which is neither viscous nor stringy, unlike the larvae infested with AFB (Fig. 3).

This mass dries up forming a dark rust flake similar to that of AFB but, unlike the latter, it is easily removable from the cell.



Fig. 2: The infected larvae initially lose their pearly white colour to become first opaque, then yellowish and finally yellowish-brown



Fig. 3: After death, the larva becomes darker and decomposes, turning into a soft brown mass which is neither viscous nor stringy

The brood appears scattered, with cells containing yellowed dead larvae. Depending on the bacteria present the dead larvae may give off smells of different intensity.

The *Melissococcus pluton* leads to a sour smell, with flabby, but intact larvae; if, however, it is associated with *Bacillus alvei*, the brood has a putrid smell with molten larvae (but not ropey as with AFB). There are also intermediate forms in which the combs do not give off any smell.

When the disease is not well developed, especially if you replace the queen and you are in a favourable time of the year (with the presence of abundant flowers providing nectar and pollen), bees may be able to clean up all the affected cells and the disease can disappear spontaneously, thus preventing the infection from spreading to the rest of the apiary.

Main differences between European and American foulbrood	
European Foulbrood (EFB)	American foulbrood (AFB)
Dead larva in uncapped cell	Dead larva in capped cell
Sour smell	Smell of fish gelatin
Absence of blackening of honeycombs	Dark honeycombs, deep-set and perforated cappings
Non-ropey larva	Ropey larva
Removable flake	No removable flake

DIAGNOSIS

For the field diagnosis it is sufficient to examine the brood and to look for the symptoms described above (scattered brood, yellowed dead larvae in open cells, sour smell, etc.), which can be combined with the use of a rapid diagnostic kit, easily available on the market (Fig. 4). For disease confirmation, you can send a sample of the dead larvae to specialised laboratories where the pathogens responsible for the disease can be isolated (Fig.5).



Fig.4: Rapid diagnostic kit (positive result above, negative below)



Fig. 5: Sample of dead larvae taken to be sent to specialised laboratories for the diagnosis

CONTROL

Take the appropriate actions as soon as possible to control the infection, such as:

- destruction by incineration of the infected colonies (honeycombs and honey bees; the hives, if in good state, could be disinfected). This

action is suggested in case of advanced stage of the disease, weak colonies or low prevalence of the disease in the apiary;

- accurate disinfection of all objects used for the manipulation of infected hives, including equipment used for operations by the beekeeper (e.g. the hive tool, the gloves, the suit, the honey extractor, etc.);
- shook swarm method, consisting in shaking the hives from the infected combs into a clean hive with new foundation.

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PREVENTION

- Ensure that colonies have always available stocks of food (pollen and honey).
- Do not use honeys suspected of being infected to feed the bees.
- Do not move combs from a hive to another without checking their healthy conditions.
- Renew the combs every 2-3 years (about 30% of the combs per year).
- Remove the queen from the infected colonies.

See related technologies published on TECA by Apimondia and IZSLT on bee diseases:

1. [Good beekeeping practices](#)
2. [Main diseases of honey bees](#)
3. [Nosemosis](#)
4. [Varroa mites \(Varroatosis or Varroosis\)](#)
5. [AFB \(American Foulbrood\)](#)
6. [EFB \(European foulbrood\)](#)
7. [Bee viruses](#)

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Further reading

Ferrari C., La Peste Europea. In "Aspetti igienico-sanitari in apicoltura" published by Istituto Zooprofilattico Sperimentale del Lazio e della Toscana "M. Aleandri", Italy, August 2007, 19-21

Ellis J., Honey Bee Research and Extension Lab at the University of Florida, Video Field Guide to Beekeeping – American & European Foulbrood, January 2012, <https://www.youtube.com/watch?v=s74WIPpGRHs>

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Apimondia

Apimondia, the **International Federation of Beekeepers' Associations**, is the world organisation representing the interests of apiculture and aims to facilitate links between beekeepers, scientists and all involved with apiculture. Apimondia stems from the International Committee of Apicultural Congresses created in 1893 holding the first congress in 1897 in Belgium. Apimondia in its current institutional form was founded in the Netherlands in 1949 and its core business is the organisation of international apicultural congresses and symposia. Today Apimondia work remains truly international: Apimondia is run on a basis of co-

operation between beekeepers and scientists from many countries as well as international organisations. A special feature of Apimondia is the wide range of working languages used in publications and at meetings.



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You can also visit **Apimondia** linked websites to find out more:

www.apimondia.org

www.apimondia2013.com

www.apimondia2015.com

www.beethecampaign.org

Apimondia, la **Federación Internacional de las Asociaciones de Apicultores**, es la organización mundial que representa los intereses de la apicultura y su objetivo es facilitar los vínculos entre los apicultores, los científicos y todos los involucrados con la apicultura. Apimondia deriva del Comité Internacional de los Congresos Apícolas creado en 1893 y con la celebración del primer congreso en 1897 en Bélgica. Apimondia, en su forma institucional actual, fue fundada en los Países Bajos en 1949 y su actividad principal es la organización de congresos y simposios apícolas internacionales. Hoy el trabajo de Apimondia permanece verdaderamente internacional: Apimondia realiza su programa sobre la base de la cooperación entre los apicultores y los científicos de muchos países, así como organizaciones internacionales. Una característica especial de Apimondia es la amplia gama de idiomas utilizados en las publicaciones y en las reuniones de trabajo.

Para más informes puede visitar los sitios web de Apimondia:

www.apimondia.org

www.apimondia2013.com

www.apimondia2015.com

www.beethecampaign.org

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IZSLT - Istituto Zooprofilattico Sperimentale del Lazio e della Toscana “Mariano Aleandri”

The Istituto Zooprofilattico Sperimentale del Lazio e della Toscana “Mariano Aleandri” (IZSLT) is a public body operating in the frame of the National Health Service with duties related to animal health and welfare and food safety. In such areas it provides services in the diagnosis of animal diseases and zoonoses, microbiological, chemical and physical controls over safety of foods, food production chains and animal feed. In the same areas it performs research, epidemiological surveillance, continuous training and international cooperation activities.

IZSLT’s mission is to ensure that animal health and welfare, hygiene of farms, primary productions, safety of foods and animal feed comply with the relevant legislation.



To effectively fulfill its mission, the Institute carries out:

- diagnostic service over animal diseases and zoonoses;
- scientific and technical support to veterinary and public health services for controls on animals, food and feed;
- laboratory tests to verify the health status of animals;
- technical and scientific support to monitor veterinary medicines;
- research on animal health and welfare, food safety and hygiene of farming and livestock products;
- studies on animal welfare and development of alternatives to the use of animals in experiments;
- studies to monitor the safety of food of animal origin and feed;
- scientific and technological cooperation with other research institutes;
- epidemiological surveillance on animal health and food safety, on livestock products and on environmental factors affecting the above;
- studies on the health risks for humans linked to animals and animal products;
- support, technical assistance and hygiene information to manufacturers of food of animal origin;
- production of vaccines and laboratory diagnostics for the improvement of animal health.

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In the frame of IZSLT activities, the Apiculture Unit's mission (<http://www.izslt.it/apicoltura/>) is to certify and guarantee the health and welfare of bees, and the hygiene and safety of the hive products, through: diagnosis of bee diseases and analyses on hive products, support to Governmental Institutions in drawing up legislation, research activity, collaboration with other laboratories or institutions, technical support and training for operators, pollution environmental monitoring using honey bees and protection of honey bee biodiversity.

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