



VISUAL MANUAL FOR EU BEEKEEPERS

# Proper beehive management (Vol. 2)



## Introduction

This 2<sup>nd</sup> booklet visually presents the priority practices identified by European beekeepers to properly manage American foulbrood and how to properly set up and manage the honey bee colonies.

These practices will be discussed, developed and defined in 13 EU countries in 2024 by the B-THENET Thematic Network.

Each practice is introduced with a short description and a picture taken by beekeepers.

This document represents a baseline to start the development of the International Guidelines for Advisors in Europe.

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Discover the initial practices in  
Proper Beehive Management (Vol. 1)  
**here**



# Table of Contents

## GOOD BEEKEEPING PRACTICES

### COLONY SET-UP AND MANAGEMENT/MAINTENANCE

#### CLUSTER 1

##### WINTERING COLONIES

**1.1** Feeding and verify food storage 7

**1.2** Overwinter in the brood chamber 8

#### CLUSTER 2

##### SWARMING PREVENTION

**2.1** Expanding the colony to give the colony space 9

**2.2** Adding honey supers 10

#### CLUSTER 3

##### PREVENTION OF DISEASE TRANSMISSION WHEN TRANSFERRING COLONIES, BEES OR FRAMES

**3.1** Only transfer disease-free bees and/or frames to other colonies 11

**3.2** Follow national rules for migratory beekeeping 12

**3.3** Carry out inspections for honey bee diseases before transferring colonies to a new location 13

#### CLUSTER 4

##### COLONY INSPECTION

**4.1** Evaluate the space needed by the growing colony 14

**4.2** Evaluate the food stores 15

**4.3** Optimise inspection time/number of visits (e.g., to minimise stress; planning) 16

**4.4** Internal colony evaluation 17

**4.5** Inspect colonies during suitable weather conditions 18

# Table of Contents

## GOOD BEEKEEPING PRACTICES

### COLONY SET-UP AND MANAGEMENT/MAINTENANCE

#### CLUSTER 5

##### QUEEN REARING

---

- |   |    |
|---|----|
| <b>5.1</b> Choose the best colonies as larvae donors                              | 19 |
| <b>5.2</b> Evaluation of mating success and start of oviposition of the new queen | 20 |
- 

#### CLUSTER 6

##### COMB MANAGEMENT

---

- |  |    |
|--|----|
| <b>6.1</b> Replace beehive frames (how many and when)  | 21 |
| <b>6.2</b> Wax moth control and wax moth safe comb storage                                   | 22 |
| <b>6.3</b> Processing beeswax – from removing old combs to production of new wax foundations | 23 |
- 

#### CLUSTER 7

##### IMPROVEMENT OF COLONY RESILIENCE AND RESISTANCE TO DISEASES

---

- |   |    |
|---|----|
| <b>7.1</b> Eliminate diseased colonies, so that they cannot reproduce   | 24 |
| <b>7.2</b> Perform selection to have queens that are more resistant to disease and adapted to local climatic conditions | 25 |
- 

#### CLUSTER 8

##### ROUTINE QUEEN MANAGEMENT

---

- |  |    |
|--|----|
| <b>8.1</b> Replace queens with high mite levels and or poor hygienic behaviour | 26 |
|--|----|
-

# Table of Contents

## BIOSECURITY MEASURES IN BEEKEEPING AMERICAN FOULBROOD

### CLUSTER 1

#### PREVENTION OF AFB OUTBREAKS

---

- 1.1** Visual inspection of brood combs during work in the colony **28**
- 
- 1.2** Management of asymptomatic colonies when AFB cases have been detected in the apiary or in other hives of the same beekeeper **29**
- 

### CLUSTER 2

#### DISINFECTION OF MATERIALS OF AFB CONTAMINATED COLONIES

---

- 2.1** Disinfection of apiary after AFB sanitation **30**
- 
- 2.2** Disinfection of flammable beekeeping equipment (e.g., wooden hives or nucs, boards, frames, combs, wax sterilisation etc.) **31**
- 

### CLUSTER 3

#### DETECTION OF AFB

---

- 3.1** Visual detection of AFB-typical signs **32**
- 
- 3.2** Information about the AFB case to neighboring beekeepers/ apiaries/migratory apiaries **33**
- 

### CLUSTER 4

#### MANAGEMENT OF HIVES THAT SHOW CLINICAL SYMPTOMS OF AFB

---

- 4.1** Destruction of AFB positive colonies or whole apiary **34**
- 
- 4.2** Establish a “Disinfection unit” in the local community **35**
-

# GOOD BEEKEEPING PRACTICES

## COLONY SET-UP AND MANAGEMENT/MAINTENANCE

# GOOD BEEKEEPING PRACTICES

## COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 1

#### WINTERING COLONIES

#### 1.1

##### Feeding and verify food storage

The honey bee colony must have enough food to eat at all times. To ensure that the colony has enough food to survive a longer period without flowers to collect nectar from, the colony needs to be fed extra food. This can be done in many ways, usually by a device on the colony allowing the bees to collect, process and store the food in the wax combs. Just like with honey.



Feeding sugar solution  
©Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 1 WINTERING COLONIES

#### 1.2 Overwinter in the brood chamber

Winter is a critical period for honeybee colonies. Honeybees generally stay in the brood chamber, in a cluster. An appropriate beehive volume and honey or sugar supply are essential to guarantee an efficient thermoregulation. Most of the autumn and winter beekeeper's activities are carried out for these purposes.



*Reducing the beehive volume guarantees a better thermoregulation in winter*

© Filippo Jannoni-Sebastianini

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 2 SWARMING PREVENTION

#### 2.1

#### Expanding the colony to give the colony space

When spring comes, the queen will start laying eggs and the colony will grow. To allow the full development of the colony and to prevent swarming extra space is needed for both brood, bees, pollen and honey.



*Expanding the honey bee colony*

© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 2 SWARMING PREVENTION

#### 2.2

#### Adding honey supers

Adding honey supers is useful for both swarming prevention and honey production. The honey supers increase the hive volume and give more space for the honey storage. The lack of space is one of the causes of the swarming and the production loss. On one hand, the space becomes insufficient for the brood and on the other hand if the space is limited for honey storage the honeybees stop collecting nectar. Anyway, the honey supers have to be added at the right time of the colony's development.



*Adding supers prevents swarming and increases honey production*

© Filippo Jannoni-Sebastianini

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 3 PREVENTION OF DISEASE TRANSMISSION WHEN TRANSFERRING COLONIES, BEES OR FRAMES

#### 3.1 Only transfer disease-free bees and/or frames to other colonies

To avoid the transfer of diseases between honey bee colonies, the beekeeper needs to make sure that frames of brood or adult honey bees come from colonies without any symptoms of disease.



*Frame with healthy brood*

© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 3 PREVENTION OF DISEASE TRANSMISSION WHEN TRANSFERRING COLONIES, BEES OR FRAMES

#### 3.2 Follow national rules for migratory beekeeping

When moving honey bee colonies from one place to another, national regulations regarding restrictions of movements must be followed at all times. Contact the national responsible authorities for the latest updates of the regulations.



*Transport of honey bee colonies*  
© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 3 PREVENTION OF DISEASE TRANSMISSION WHEN TRANSFERRING COLONIES, BEES OR FRAMES

#### 3.3 Carry out inspections for honey bee diseases before transferring colonies to a new location

Checking the health status and maintaining healthy colonies is essential for the correct management of the colony. Carrying out inspections for honeybee diseases before transferring colonies is essential first of all to avoid spreading diseases to other apiaries as well as to optimize your work. Sick or weak colonies are not productive and if they are moved for honey production it is a waste of time and work.



*Inspecting the colony before transferring it reduces the spread of diseases*

© Filippo Jannoni-Sebastianini

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 4 COLONY INSPECTION

#### 4.1

#### Evaluate the space needed by the growing colony

A strong honey bee colony can handle if the space is larger than it needs at the given time. However, a weak colony will not develop and grow in size, if the space given is too big. If this is the case, some diseases might thrive in this environment and even weaken the colony further. Always evaluate the optimal space needed by the bees to allow healthy colonies.



*Evaluating the space needed for the  
honey bee colony*

© Apinordica

## GOOD BEEKEEPING PRACTICES

### COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

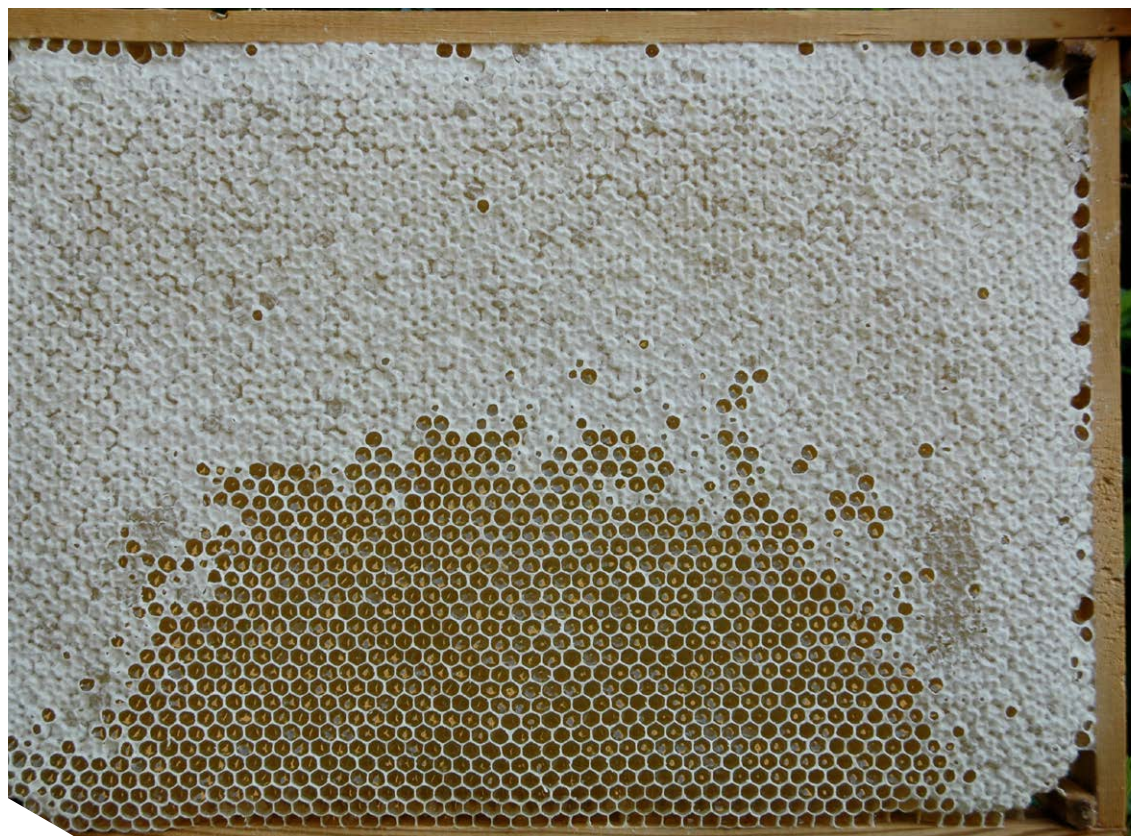
#### CLUSTER 4

##### COLONY INSPECTION

#### 4.2

##### Evaluate the food stores

The honey bee colony must have enough food to eat at all times. If the storage of honey is too small, the queen will stop producing eggs and the winter bees might be too few to make it through the winter. To ensure that the colony has enough food to survive without flowers to collect nectar from due to bad weather (too wet, too dry or too cold) always leave enough honey for the colony when harvesting honey during the season.



*A full frame of honey*  
© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 4 COLONY INSPECTION

#### 4.3 Optimise inspection time/ number of visits (e.g., to minimise stress; planning)

To avoid stressing the bees unnecessarily while inspecting the colony status or making other management practices, always plan the work. Can more than one aspect of the management be done at the same time, to avoid disturbing the colonies soon again?



Colony inspection  
© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 4 COLONY INSPECTION

#### 4.4 Internal colony evaluation

To keep healthy honey bees, inspections of the brood chamber and the food storage are important. This evaluation cannot be done just by checking if the bees are flying or not. The hive needs to be opened, and an internal evaluation of the actual situation needs to be done. This is to be able to take the right measures that will support the development of the colony.



*Evaluation of the honey bee colony*

© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 4 COLONY INSPECTION

#### 4.5 Inspect colonies during suitable weather conditions

Inspection of the colonies is an essential activity for monitoring the development and the health of the beehive. Although it could be necessary visiting a colony also with critical weather conditions, inspecting beehives during suitable weather conditions - that is when the honeybees fly - is better to reduce the stress both for the honeybees and for the beekeeper. During bad weather conditions, honeybees are generally more aggressive and there is also the concrete risk of exposing the brood to a drop in temperature.



*Inspecting colonies in suitable weather conditions reduces stress on the bees*

© Filippo Jannoni-Sebastianini

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 5 QUEEN REARING

#### 5.1 Choose the best colonies as larvae donors

It is important to control the quality of the colonies that you plan to produce new queens from. It is equally important to check the quality of the colonies providing the drones mating with the queens.



*Mating boxes for queens*  
© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 5 QUEEN REARING

#### 5.2 Evaluation of mating success and start of oviposition of the new queen

When we raise or rear a new queen, for own use or for sale, it is necessary to evaluate if she is mated and performs an adequate oviposition. Visual inspection of the behaviour of the queen and the number and distribution of the eggs laid is the best way to evaluate the queen performance.



*Checking the eggs and larvae presence for evaluation of mating success*

© Kimmel

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 6 COMB MANAGEMENT

#### 6.1 Replace beehive frames (how many and when)

If you have damaged or old frames (old wax combs from the brood nest), make sure that you remove them and replace them with new fresh ones before the wintering period. This is to prevent bee diseases from developing in the colony or providing drone brood to be produced in excess, which is beneficial for the reproduction of varroa.



*Old frames from the brood chamber were removed and melted down in solar melting equipment*

© Apinordica



*New wax foundations*

© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 6 COMB MANAGEMENT

#### 6.2

#### Wax moth control and wax moth safe comb storage

Wax moth larvae live on beeswax, especially on old combs with cocoons and pollen. They develop quickly in warm temperatures. Frames with wax combs need to be protected from being destroyed by wax moth larvae when stored outside the beehive.



*Frames eaten and covered by wax moth larvae.  
Cold storage for frames with drawn combs, safe  
from wax moth attacks*

© Apinordica

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 6 COMB MANAGEMENT

#### 6.3 Processing beeswax – from removing old combs to production of new wax foundations

The management of the beeswax is essential to guarantee suitable combs and for beeswax production. The oldest or unsuitable combs (too dark, damaged, broken, mouldy, etc.) can be removed in autumn or early spring when they are empty. The new ones have to be added during the spring development. The old combs can be melted to produce beeswax for sale or for the new sheets of wax foundations.



*Removed old wax can be used for producing new wax foundations*

© Filippo Jannoni-Sebastianini

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 7 IMPROVEMENT OF COLONY RESILIENCE AND RESISTANCE TO DISEASES

#### 7.1 Eliminate diseased colonies, so that they cannot reproduce

A diseased colony is a real and potential danger for the other colonies of the same apiary and also of the other ones nearby. The disease can be spread by the usual honeybees' activities and by the beekeeper's management practices, first of all by producing new artificial swarms. Elimination of the weakest or the colonies that cannot be treated is an efficient measure for the hygiene and disease prevention.



*Removing diseased colony avoids spread of diseases*

© Filippo Jannoni-Sebastianini

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 7

#### IMPROVEMENT OF COLONY RESILIENCE AND RESISTANCE TO DISEASES

### 7.2

#### Perform selection to have queens that are more resistant to disease and adapted to local climatic conditions

Using good queens is very important for a correct management in beekeeping. Queens are healthy if they are productive, resistant to diseases and adapted to local conditions. Genetic selection is central to obtain that. Better if it is done on the same honeybee population of the apiary. Otherwise it is recommended buying queens from breeders that raise queens in the same area.



*Pin-test. An important method to evaluate the hygienic behaviour of the queen*

© Stefano De Pascale

## GOOD BEEKEEPING PRACTICES COLONY SET-UP AND MANAGEMENT/ MAINTENANCE

### CLUSTER 8 ROUTINE QUEEN MANAGEMENT

#### 8.1 Replace queens with high mite levels and or poor hygienic behaviour

The tolerance to varroa infestation or to other diseases can be due to the honeybee queen. In case of inadequate level of tolerance, it could be useful to replace the queen. To evaluate the hygienic performance of the queen (and the colony) the pin test is a good method. This technique consists of piercing with a pin pad a comb section of 50 capped cells and checking how many of them have been removed by the bees. The more dead cells are removed, the higher is the hygienic behaviour.



*Replacing a queen with a selected one can be essential for a healthy colony*

© Stefano De Pascale

# BIOSECURITY MEASURES IN BEEKEEPING AMERICAN FOULBROOD

# BIOSECURITY MEASURES IN BEEKEEPING

## AMERICAN FOULBROOD

### CLUSTER 1

#### PREVENTION OF AFB OUTBREAKS

#### 1.1

### Visual inspection of brood combs during work in the colony

Visual inspection of brood during colony work is an essential practice for detecting signs of diseases like American Foulbrood. During these inspections, beekeepers should carefully examine brood cells for typical signs of the disease, such as pupal remains attached to cells, irregular patterns of capped brood, or the presence of darkened comb. Identifying these signs allows for quick action to prevent the spread of the disease and protect bee health in the colony.



*Dull white, becoming light brown, coffee to dark brown and almost black dead pupae, usually lies flat, sometimes with a narrow projection as a tongue, it is becoming sticky to ropy, with a slight to pronounced odor of decay that can be test with a small stick*

© Carlos Marin

# BIOSECURITY MEASURES IN BEEKEEPING

## AMERICAN FOULBROOD

### CLUSTER 1

#### PREVENTION OF AFB OUTBREAKS

### 1.2

#### Management of asymptomatic colonies when AFB cases have been detected in the apiary or in other hives of the same beekeeper

Upon detection of American Foulbrood in the apiary, it is crucial to manage asymptomatic colonies properly. Tests should be conducted to detect the presence of the disease and increase visual inspections. If the presence of the disease is confirmed, drastic measures should be taken, such as separating the affected hives and moving them to a hospital apiary. Additionally, provisional measures need to be established to control the spread of the disease and maintain constant vigilance.



*Honeybees become infected in early larval life and usually die in the pupal stage as seen in this comb*

© Dolores Sánchez

# BIOSECURITY MEASURES IN BEEKEEPING

## AMERICAN FOULBROOD

### CLUSTER 2

#### DISINFECTION OF MATERIALS OF AFB CONTAMINATED COLONIES

### 2.1

#### Disinfection of apiary after AFB sanitation

Disinfection of the apiary after carrying out sanitation against American Foulbrood is essential to prevent the reoccurrence of the disease. This involves thorough cleaning of all beekeeping material, including hives, wooden nuclei, boards, frames, and combs, as well as wax sterilization. Specific disinfection protocols should be followed, such as using disinfectant solutions, moist or dry heat, and ensuring that all equipment is free from *Paenibacillus* larvae spores, the causative agent of the disease. This measure is crucial for protecting bee health and maintaining apiary integrity.



*Constant apiary inspection have reduced the presence of AFB as well as populations of resistant bees, buying old, stored beekeeping equipment can lead to transmission due to harbouring spores*

© Aránzazu Meana

# BIOSECURITY MEASURES IN BEEKEEPING AMERICAN FOULBROOD

## CLUSTER 2 DISINFECTION OF MATERIALS OF AFB CONTAMINATED COLONIES

### 2.2 Disinfection of flammable beekeeping equipment (e.g., wooden hives or nucs, boards, frames, combs, wax sterilisation etc.)

Disinfecting flammable beekeeping material, such as hives, wooden nuclei, boards, frames, and combs, is crucial to prevent the spread of diseases like American Foulbrood. Various methods can be used, such as incineration of flammable material or disinfection with chemicals or heat. Thorough cleaning of the material before disinfection and careful adherence to instructions are important to ensure effective disinfection. This process is crucial for maintaining bee health and protecting the integrity of hives in the beekeeping operation.



*Destruction of bees and combs from infected colonies is the most efficient method of keeping the diseased in check, while routine cleaning and decontamination of material is also very useful*

© Aránzazu Meana

# BIOSECURITY MEASURES IN BEEKEEPING

## AMERICAN FOULBROOD

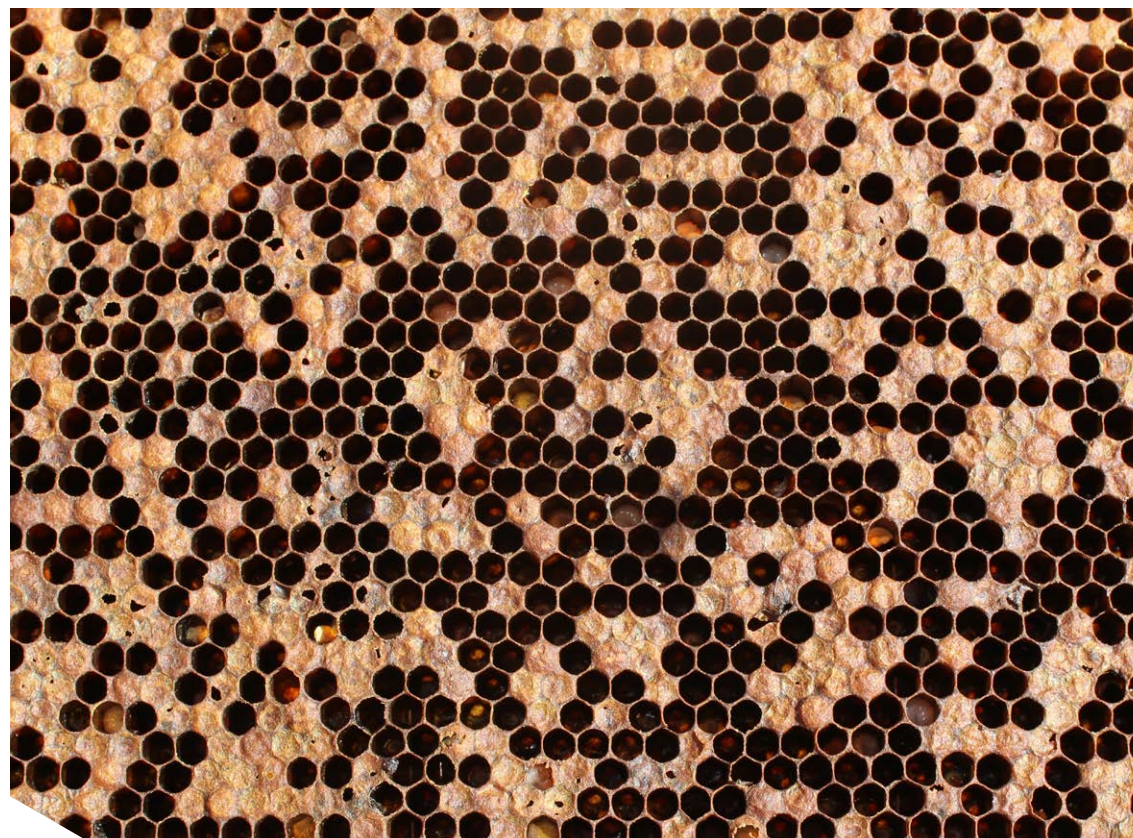
### CLUSTER 3

#### DETECTION OF AFB

### 3.1

#### Visual detection of AFB-typical signs

Visual detection of typical signs of American Foulbrood is essential for identifying the disease in hives. This involves looking for signs such as pupal remains attached to the cell, irregular patterns of capped brood, and darkened comb. A beekeeper with adequate knowledge can make an initial diagnosis in the field by carefully inspecting the brood chamber for characteristic signs. This early detection is crucial for implementing control measures and preventing the spread of the disease among hives.



*The brood comb has sealed cells, discoloured, sunken or punctured cappings. Older larvae or young pupae that remains upright in the cell*

© Dolores Sánchez

# BIOSECURITY MEASURES IN BEEKEEPING

## AMERICAN FOULBROOD

### CLUSTER 3

#### DETECTION OF AFB

### 3.2

#### Information about the AFB case to neighboring beekeepers/apiaries/ migratory apiaries

Reporting cases of American Foulbrood to neighbouring beekeepers and apiaries is a crucial practice in preventing the spread of the disease. Rapid and effective communication about detected cases helps beekeepers take preventive measures and maintain the health of their hives. This may include sharing information about disease symptoms, detection methods, and recommended control measures. Collaboration among beekeepers and transparency in case disclosure are essential to protect the beekeeping industry and minimize the impact of American Foulbrood on bee populations.



*Beekeepers must know that the chief problem in attempting the control of AFB is that the bacterium forms spores that remains alive for more than 70 years*

© CIAPA

# BIOSECURITY MEASURES IN BEEKEEPING

## AMERICAN FOULBROOD

### CLUSTER 4

MANAGEMENT OF HIVES THAT SHOW CLINICAL  
SYMPTOMS OF AFB

#### 4.1

#### Destruction of AFB positive colonies or whole apiary

The destruction of colonies positive for American Foulbrood or the entire apiary is a drastic but necessary measure to prevent the spread of the disease. If the presence of the disease is confirmed in any colony, it is crucial to take quick and decisive actions to eliminate it, which may involve destroying the affected hives or even the entire apiary if necessary. This extreme measure helps prevent the spread of the disease to other colonies and protects the health of bees in the beekeeping community. Some countries have specific rules in the control of this disease that must compulsorily been accomplished.



*Burning although a great loss of equipment and bees is considered the best way to deal with AFB*

© Aránzazu Meana

# BIOSECURITY MEASURES IN BEEKEEPING

## AMERICAN FOULBROOD

### CLUSTER 4

MANAGEMENT OF HIVES THAT SHOW CLINICAL  
SYMPTOMS OF AFB

#### 4.2

#### Establish a “Disinfection unit” in the local community

Establishing a “disinfection unit” in the local community involves forming a monitoring group to manage American Foulbrood properly. This can be achieved by joining a Livestock Health Defence Group (LHDG). This unit should be prepared to carry out effective disinfection procedures, including the removal of contaminated material and the use of appropriate methods to disinfect beekeeping equipment. Collaboration and coordination within the community are essential to effectively combat the spread of the disease.



*Access to updated information by beekeepers is a strong tool to avoid diseases, as well as having accessible facilities to eliminate or decontaminate beekeeping material*

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