BTHENET
Bee Stronger Together

VISUAL MANUAL FOR EU BEEKEEPERS

Proper beehive management (Vol. 1)

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European beekeepers are suffering considerable losses due to multiple stressors

such as climate change, pathogens and anthropogenic pressures (wrong pesticide use, environmental pollution, habitat fragmentation). A new approach to manage beekeeping challenges is necessary to provide beekeepers with practical guidance.

The project B-THENET (www.bthenet.eu/) aims to support European beekeeping. The visual manual for EU Beekeepers (Vol. 1) illustrates the **results of the European survey distributed to 2,094 beekeepers from 22 EU countries**. It provides an overview of the 22 practices that have been identified by beekeepers as the most important to develop.

In 2023 we will discuss “Apiary set-up and management/maintenance” practices, and practices to manage “Varroosis”. In the next 3 volumes that will follow this one, we will cover all main areas of honey bee management, discussing other general Good Beekeeping Practices and specific measures to control honey bee diseases (Biosecurity Measures).

In this booklet, practices identified by European beekeepers in 2023 are visually presented. Each practice is introduced with a short description and pictures captured by beekeepers. If you would like to help B-THENET researchers developing the full description, join our “Exchange platform” (www.bthenet.eu/platform/), where practices are currently being described.

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CLUSTER 1

IDENTIFY A PROPER AREA TO LOCATE THE APIARY

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GOOD BEEKEEPING PRACTICES

CLUSTER 1
IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.1
Avoiding exposure to pollutants

When choosing the site for an apiary, make sure that within the flight range of the bees, generally defined as **3 kilometres**, do not have any sources that might risk polluting the honey or other bee products.

Sources for pollution might be intensive conventional farming areas, heavily trafficked highways, garbage dumps or industrial areas.

Application of pesticides on a field | ©Pixabay

GOOD BEEKEEPING PRACTICES

CLUSTER 1
IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.2
Setting-up apiaries in an area accessible to vehicles

It is important to ensure a solid prepared ground to avoid flooding, free of high vegetation, stones and paved access to the apiary. The possibility of making terraces in slopes should be considered as well as an easy access from the rear.

Easy access to apiary | © Aránzazu Meana

GOOD BEEKEEPING PRACTICES

CLUSTER 1
IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.3
Avoiding areas where allergenic (or toxic plants could be found in a significant quantity)

When choosing the site for an apiary, make sure that within the flight range of the bees, generally defined as **3 kilometres**, do not have big sources of toxic plants (pyrrolizidine alkaloids, PA) that can provide nectar or pollen that ends up in the honey or other bee products. Examples of plants producing PA attractive to bees are *Senecio jacobaea, Symphytum sp., Echium vulgare, Borago officinalis, Tussilago farfara* and *Cynoglossum officinale*. The threshold level for PA content in pollen is 500 *µg*/kg.

© Apinordica

The bee colonies are placed in a sea of Symphytum sp. It is a beautiful place with all the flowers but considering the risk of PA produced in the plant this site is not suitable for pollen collection.

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GOOD BEEKEEPING PRACTICES

CLUSTER 1
IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.4
Avoiding areas exposed to excessive humidity and wind

Humidity and wind can affect the development of the colony inside the hive as they can impact on brood development or negatively interfere with the thermoregulatory process provided by the adults, **exposing the whole colony to stress and diseases** (especially fungal diseases like stonebrood and chalkbrood). In case of uncapped combs, **humidity may produce damp spots and mould on the frames and internal walls**. Wind can also generate drifting problems with bees entering other adjacent hives and potentially spread diseases or lead to robbing.

Avoid areas exposed to excessive humidity and wind (hedge protecting from prevailing winds)

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GOOD BEEKEEPING PRACTICES

CLUSTER 1

IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.5

Ensuring presence of trees (or other barriers) to create protection against weather stressors

The settlement should be checked to verify the existence of trees, bushes or accidents of the ground to avoid air currents. Meshes for shading or windbreak should be considered if there is not a natural barrier.

Protecting green meshes | © Jesús Llorente

GOOD BEEKEEPING PRACTICES

CLUSTER 1
IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.6
Maintaining appropriate distance from other apiaries

The distance between different apiaries is important in order to ensure **bees have sufficient foraging pasture as well as reduce the risk of disease transmission like varroa** or foulbroods. Sufficient distance from other apiaries is pivotal in breeding and selection programmes. Adequate distancing of apiaries also reduces the impact of the presence of managed bees in favour of wild pollinators.

Maintain appropriate distance from other apiaries
© Filippo JANNONI SEBASTIANINI

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GOOD BEEKEEPING PRACTICES

CLUSTER 1

IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.7

Having enough space for storage rooms/working tools

Make sure when you set up the apiary that you provide enough space in the apiary **for food-safe management practices**. Meaning you must be able to handle the honey supers in a quality-assured way.

Having enough space in the apiary
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GOOD BEEKEEPING PRACTICES

CLUSTER 1

IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.8

Keeping safe distance from houses/ villages (for human safety);

Apiaries must be located at a safe distance from houses and villages and wherever there are human activities that can be affected or disturbed by the presence of bees in close proximity. It is important **to avoid bee stings for possible allergic reactions and also for social reasons to avoid disputes at legal level**. Apiaries should be clearly signposted and their locations must **respect local norms on safety distances** from neighbouring installations and premises where human activities are conducted. Bee swarms can generate panic and also problems in their retrieval and the population may object to or protest for the risks of being exposed to bee stings on such occurrences. Special care should be provided in respecting distances especially during the active beekeeping season; in case of need, **water should be provided to honeybee colonies to prevent frequent visits of bees to swimming pools or fountains**.

Keep your apiary at a safe distance from houses

GOOD BEEKEEPING PRACTICES

CLUSTER 1

IDENTIFY A PROPER AREA TO LOCATE THE APIARY

1.9

Preventing theft of hives

Beehives and bee colonies are valuable assets especially in rural contexts as they represent livelihood means of survival, economic income and food production. Appropriate **fencing, gates and hedges** as well as technological theft protection devices, some even **coupled with remote satellite tracking of the hives**, help prevent thefts. Marking of the hive bodies with company/ beekeeper **codes and even distinctive colours and patterns** may also help reduce the risk of thefts and can assist in recognising ownership.

Prevent theft of beehives with a fence

© Filippo JANNONI SEBASTIANINI

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GOOD BEEKEEPING PRACTICES

CLUSTER 2

SETTING-UP OF THE APIARY

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GOOD BEEKEEPING PRACTICES

CLUSTER 2
SETTING-UP OF THE APIARY

2.1
Keeping an appropriate number of hives

Apiaries must not be overcrowded with beehives. High concentration of beehives in an area may **affect the foraging pastures for the bees** and can lead to increased exposure and **spread of bee diseases** and drifting across adjacent beehives. The number of beehives must always be adjusted to the actual local availability of nectar, pollen and water sources and must not alter the balance with wild pollinators nor affect them on food resource competitive grounds.

In case of professional beekeeping, the number of hives has to be set by the average number of hives that can be visited and managed by one single beekeeper in one single day of field activity.

Keep an appropriate number of beehives
© Filippo JANNONI SEBASTIANINI

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GOOD BEEKEEPING PRACTICES

CLUSTER 2
SETTING-UP OF THE APIARY

2.2
Seasonally relocating the apiary

When choosing the site for an apiary, you need to consider many things. One of them is the local conditions during winter. Maybe a site works well for the bees during the productive season but is not fitting for the overwintering period. During winter you need to find a new suitable place for the purpose of good winter conditions for the bees. **After the honey season, you move the bee colonies to a new well-fitted winter apiary. In some places, this could be inside a storage room.**

Seasonal relocation of the apiary
© Apinordica

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GOOD BEEKEEPING PRACTICES

CLUSTER 2
SETTING-UP OF THE APIARY

2.3
Proper positioning of the hive

The hives must always be positioned in a way that they receive prolonged exposure to **direct sunlight during the day**. They should be facing South-East to help the bees in starting foraging in the morning. Moreover, the hives should not be placed directly of the ground but on stands to avoid spoiling of the beehive structure. **Beehives should be placed at about 50 cm from the ground** to ease the beekeeper's operations inside the hive.

Proper positioning of the beehive (on bricks above ground level)

GOOD BEEKEEPING PRACTICES

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2.4
Avoiding obstacles for the bees

Bees fly-line should be free from impending obstacles. Obstructions can take the form of trees, shrubs, overgrown grass, buildings, roads with traffic, stones, stacks of materials, machinery, hilltops and roaming animals. In some cases, some natural or artificial obstruction (e.g. hedges / fences) must be foreseen if the apiaries are too close to areas where people pass by or conduct their daily activities and compliance with legal distancing is required, but if the hives cannot be moved to another better place their location should still enable the bees to fly out of and back into their nest quite freely.

Avoid obstacles for the bees (keeping entrance free from grass)

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BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 1

HOW TO

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BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 1
HOW TO

1.1
Assessment of varroa infestation level during the beekeeping season

Short description: Samples of a representative number of bees should be taken to assess a varroa control test. In addition, the drone or bee brood should be checked for mites. But the best is the sanitary bottom.

Sanitary bottom with mesh
© Aránzazu Meana

BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 1
HOW TO

1.2
Identification of the best moment for varroa treatments according to the national climatic areas

Short description: The varroa control test should be carried out according to the national climate, for example in Spain they should be completed by early spring, autumn, and in summer.

Rape crop field
© Mariano

BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 2

PROPER USE OF LOW ENVIRONMENTAL IMPACT COMPOUNDS

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BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 2

PROPER USE OF LOW ENVIRONMENTAL IMPACT COMPOUNDS

2.1
Use of oxalic acid

Short description: Once the infestation level of varroa is exceeded all the hives in the apiary should be treated following the national legislation and product label. The temperature and the brood level should always be taken into consideration.

Oxalic acid
© Miguel Alonso

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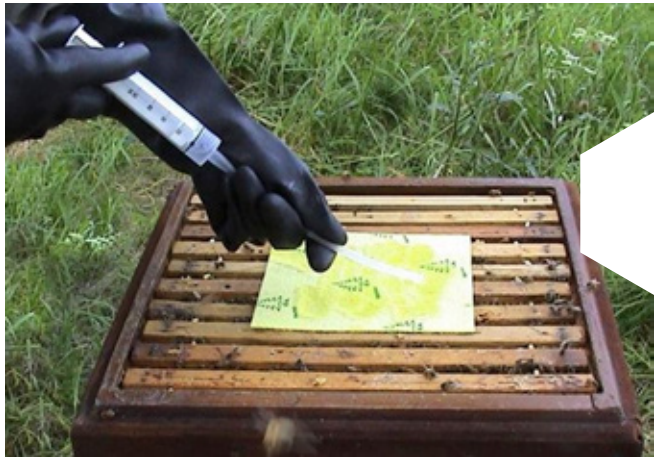
BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 2

PROPER USE OF LOW ENVIRONMENTAL IMPACT COMPOUNDS

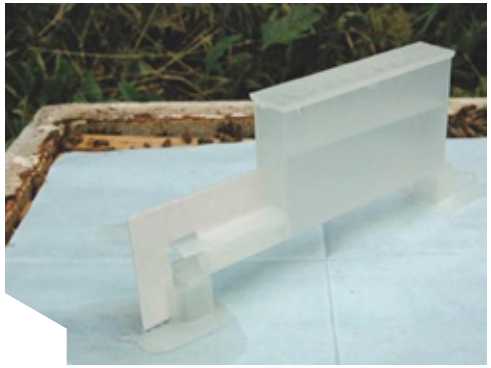
2.2
Use of formic acid

To control the varroa mite, formic acid is an option. Formic acid has the property to kill the varroa mite both in the capped brood and on the adult bees. This makes it suitable to apply just after the last honey harvest and before the feeding of the bees for the winter period. You can use a short-term treatment or a long-term treatment.



Application of formic acid

© Apinordica



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BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 2

PROPER USE OF LOW ENVIRONMENTAL IMPACT COMPOUNDS

2.3
Use of thymol

Short description: Once the infestation level of varroa is exceeded all the hives in the apiary should be treated following the national legislation and product label. The temperature and the brood level should always be taken into consideration.

Timol

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BIOSECURITY MEASURES FOR VARROOSIS

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PROPER USE OF LOW ENVIRONMENTAL IMPACT COMPOUNDS

2.4
Use other low-environmental impact compounds

Another low-environmental impact compound used to control the varroa mite is lactic acid. Lactic acid kills off varroa mites on adult bees. Meaning that this treatment is used when there is no brood in the colony. It can with advantage be used on swarms and is applied by spraying it on the bees.

Use of lactic acid
© Apinordica

BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 3

BIOTECHNIQUES

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BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 3
BIOTECHNIQUES

3.1
Brood removal

Brood removal is a biotechnique used in the control of varroa infestation. Brood frames should be removed within 24 days from the start of egg laying by the queen and frozen right after. After the brood is cleaned away the frame can be introduced again in the hive.

Drone brood removal
© Jesús Llorente

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BIOSECURITY MEASURES FOR VARROOSIS

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BIOTECHNIQUES

3.2
Queen caging

This is a method to control the varroa mite by making the colony brood less during the productive season. This is done by **caging the queen for 25 days** allowing all brood to emerge and thus preventing the queen from laying new eggs during this period. When the colony consists of only adult bees you can treat the colony with either lactic acid or oxalic acid.

Queen caging
© Apinordica

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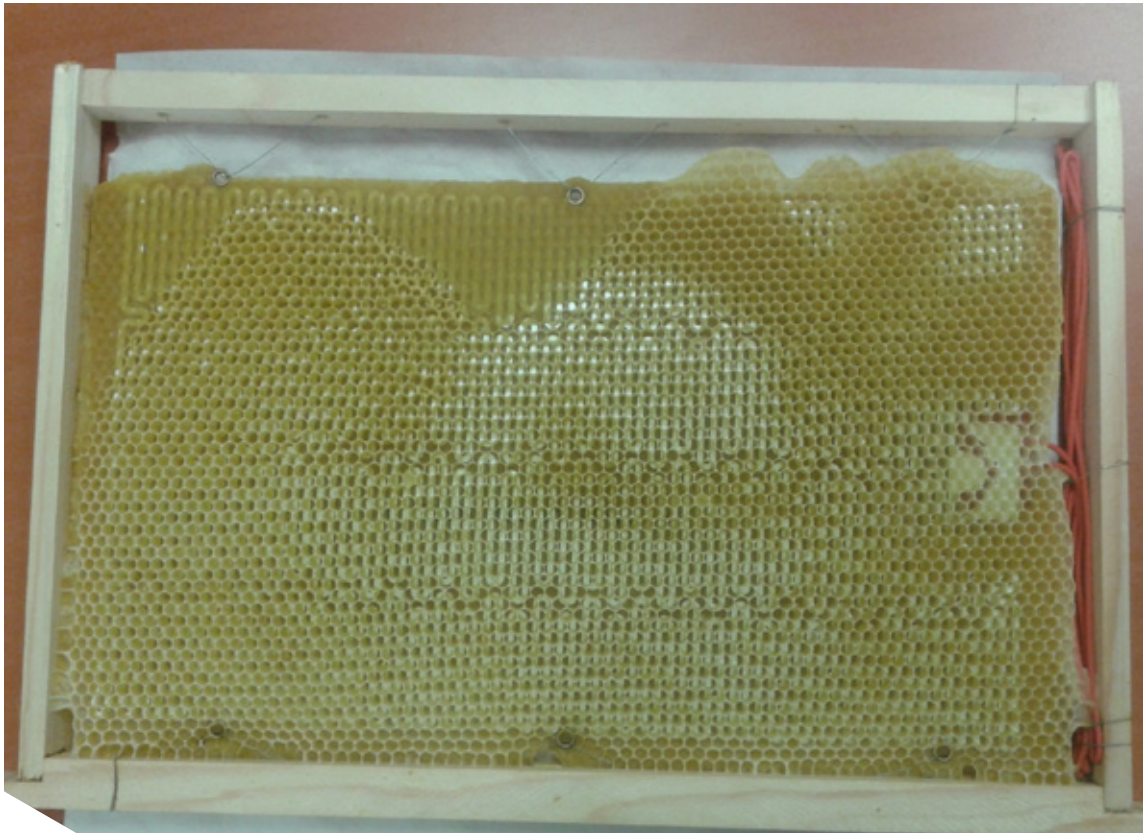
BIOSECURITY MEASURES FOR VARROOSIS

CLUSTER 3
BIOTECHNIQUES

3.3
Heat treatments

This is an alternative way of controlling the varroa mite. It builds on the concept that **above 42 °C** the varroa mite dies but the bees will survive. You **expose the bee colony to this high temperature for a maximum of 2 to 3 hours**. The temperatures and timings depend on the methods used. There are devices for treating the whole colony or devices for treating only the capped brood frames. This is having an effect on varroa mites both on the adult bees and on the varroa mites in the brood cells. This method can be used regardless of honey harvesting or weather.



Example of heating frame
© Marco Pietropaoli

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