Establishment of an experimental apiary at the UAB

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Objectives

- Know the **critical situation that bees suffer**, specifically in the EU.
- Show the guidelines to **install an experimental apiary** in the UAB campus, **and handle it correctly.**
- Define **the main indicators of interest** in tracking the hives.

Present situation in the EU

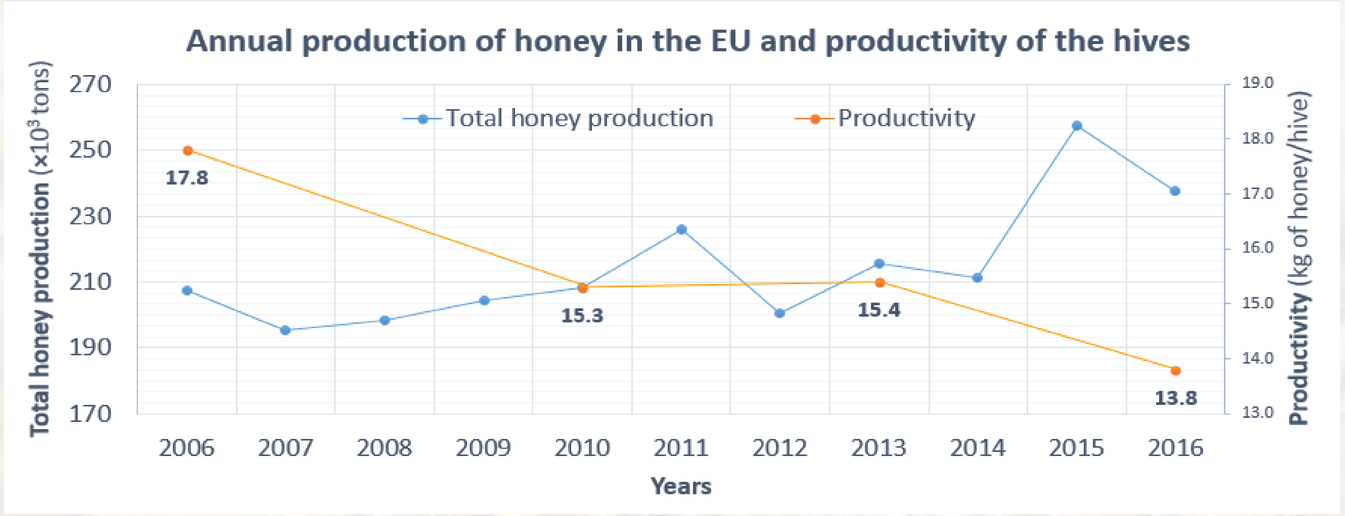

Figure 1: Annual total production of honey and productivity of the hives in the EU from 2006 to 2016.

There are high annual mortalities in Europe (Spain ≈ 13%), but with an increase in the total honey production due to the high renovation of colonies (**elevated cost of renovation**). Furthermore, there is an important decrease in productivity (**critical situation**).

Installation

Characteristics of the apiary	
Hives	6 hives (Dadant model).
Orientation	SE (+ development).
Location	Open space, protected from the wind and away from people.

Climatology and feeding: Cold winter and dry summer (Figure 3).

- Assure water supply (hygienic water trough).
- Feed with artificial feeding in January and November (cold season) and in August (dry season).
- Add melliferous plant species in the apiary with complementary flowering seasons to the rest of species.

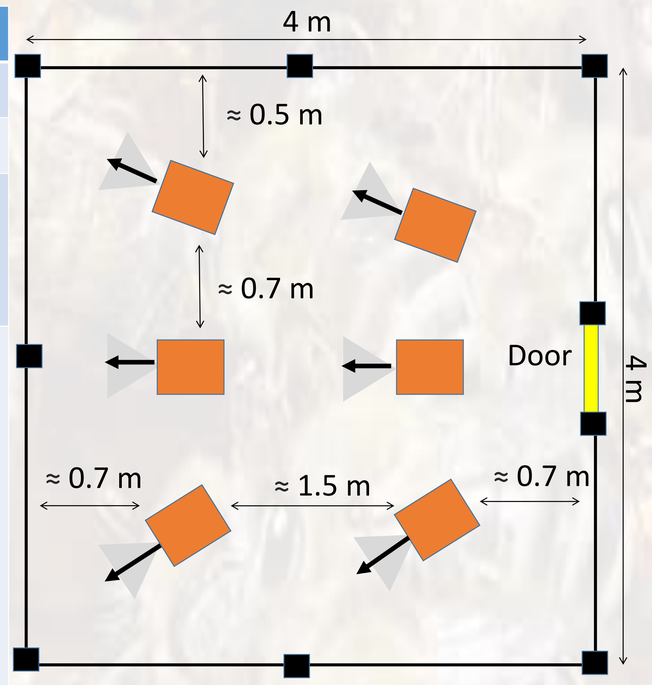

Figure 2: Scheme of the apiary (16m²) with indication of the direction of the entrances.

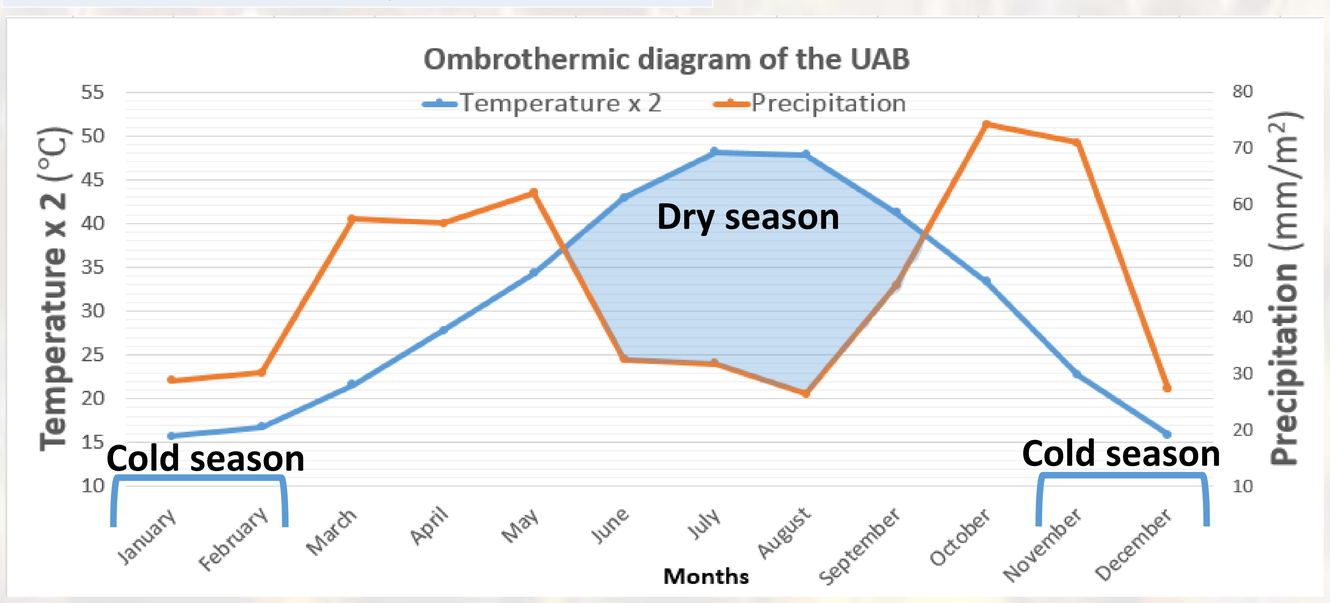

Figure 3: Ombrothermic diagram of the UAB with data from 2006 to 2016.

Field measurements

Measurements (M1-M10)
M1 (flight): During 15 minutes bees are counted as they enter and leave the hive.
M2 (temperature): Measurement of the exterior and interior temperature of the hive to evaluate the thermoregulation capacity of the colonies.
M3 (weigh and morphology of bees): Weighing live bees in a previous fast to determine their nutritional and health status.
M4 (uniformity of the brood): Determine the percentage of aggregation in the brood cells, "mosaic" pattern is a sign of a colony disease or a problem of the queen.
M5 (sick brood): Determine the percentage of brood cells with sick or dead larvae and assess their status.
M6 (cleaning): Cut a comb section of sealed brood, freeze it (-20ºC for 24 h) and reinsert it into a frame of the hive. Assess the ability to remove the dead larvae in 24 h.
M7 (queen cells): Determine the production of queen cells and their type (replacement, emergency or swarming cells).
M8 (productivity): Weigh the honey supers (only contain honey and pollen).
M9 (colony size): Determine the size of the population through photographs of the frames and computer support, knowing the density of bees in the frames (1,24 bees/cm²).
M10 (gentleness): It is scored on a scale from 1 to 4, where 1 represents the most negative phenotype.

Calendar

(1 month = 4 weeks; 1 year ≈ 48 weeks)

M7-M10 (Once per week, odd weeks from 9 to 39)

J F M A M J J A S O N D

M4-M6 (Once per week, weeks 13/17/21/25)

M1-M3 (Daily)

- Artificial feeding.
- Minimize hive handling, because to **thermal stress** in winter and **alteration of the colonies routine**.
- When measurements are superimposed, carry them out in a single opening of the hive.

Conclusions

- The actual situation of bees (*A. mellifera)* in Europe **is critical** (high mortality and low productivity).
- The establishment of an experimental apiary is a way to contribute to find the causes of the problem and **to look for solutions (wide range of research possibilities).**
- Bees **are very sensitive** to the availability of food and management, so it is necessary to develop **a complete calendar of tasks.**

Bibliography

Büchler R., Andonov S., Bienefeld K., Costa C., Hatjina F., Kezic N., Kryger P., Spivack M., Uzunov A., Wilde J. 2013. Standard methods for rearing and selection of Apis mellifera queens. J.Apicultural Res. 52:1-30.

Delaplane K.S., Van der Steen J., Guzman-Novoa E. 2013. Standard methods for estimating strength parameters of Apis mellifera colonies. J. Apicultural Res. 52:36-53.

Gerig L. 1983. Course in determination of colony strength. Bee J. 106:199-204.

Informe de la comisión de 2016 sobre el Reglamento (UE) nº 1308/2013 del Parlamento Europeo y del Consejo por el que se crea la organización común de mercados de los productos agrarios. https://eur-lex.europa.eu/

Servei Meteorològic de Catalunya. Anuari de dades meteorològiques 2018. http://www.meteo.cat/wpweb/climatologia/serveis-i-dades-climatiques/anuaris-de-dades