



# ***How Artificial Protein Supplementation Improves Honey Bee Colony Condition in the Fields During Low Food Periods***



**USP**

APILAB



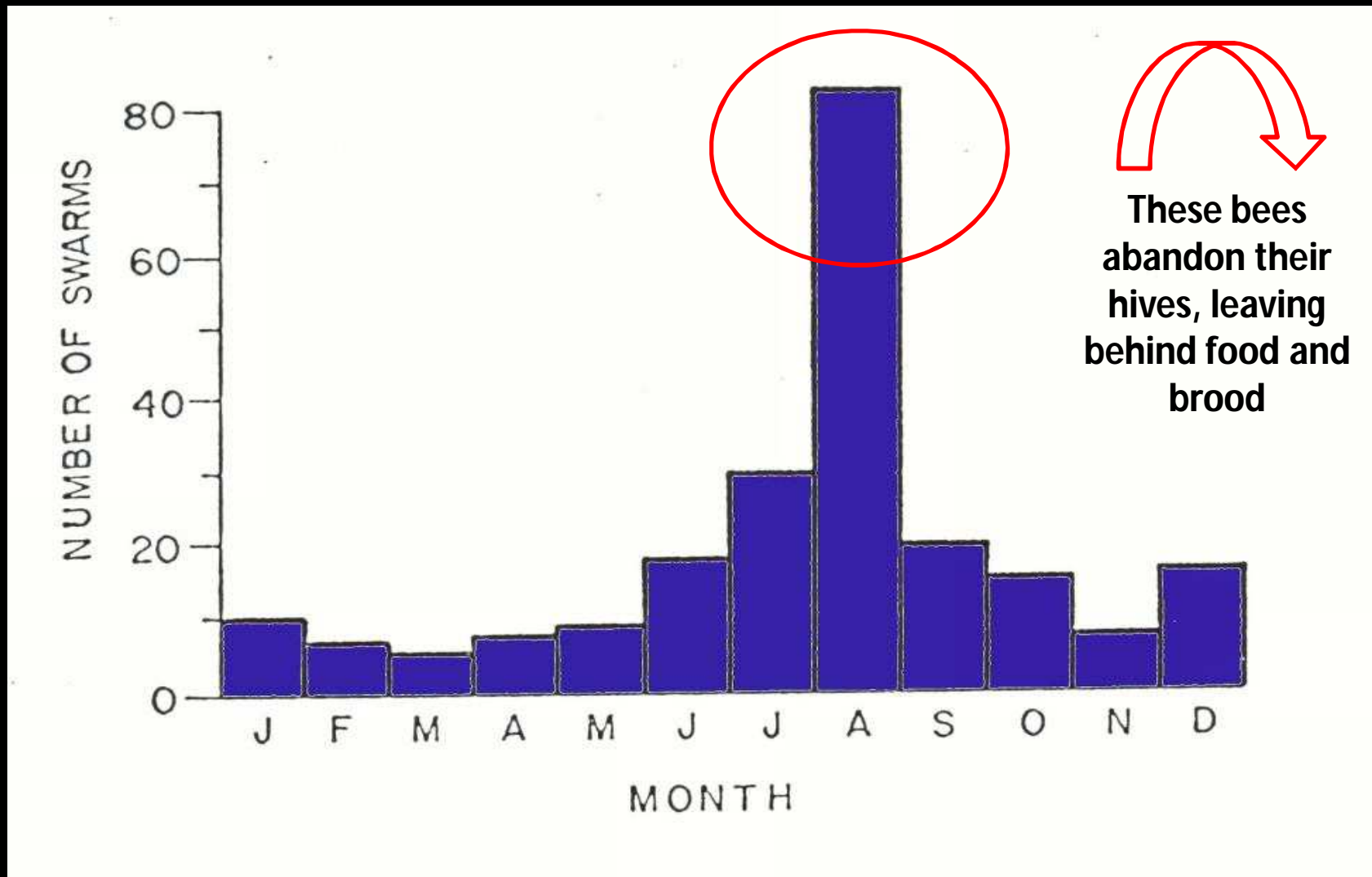
**bioabelha**fapesp

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## MAP OF SOUTH AMERICA. NORTH-EAST BRAZIL IN YELLOW



# SWARMING BEHAVIOR OF AHB



Frequency of swarms during the year in North-east Brazil (> 50%)

# Lack of pollen for the bees



Productivity  
of Queens



Population  
in the Colony



Quantity of Food  
Inside the Colony

**Weakens the Colony**



- Develop and determine the efficiency of some artificial diets rich in proteins



- Which can replace natural pollen in an efficient way



- Using material that is reasonably priced and easy to prepare





# Case Study

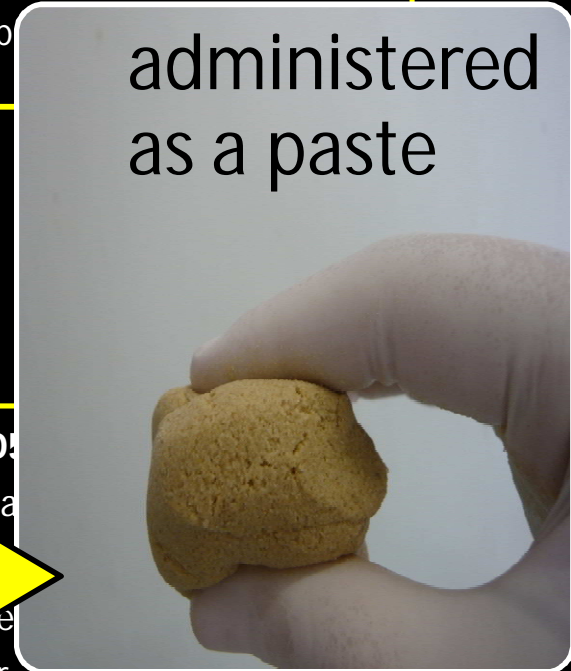
Crude Protein 20.2%

Researched some ingredients  
with high protein composition  
and were easily accessible

Prepared this diet in a paste  
and supplied it to the bees

**DIET D4**  
Soy Milk  
Albumin  
Sugar

administered  
as a paste



Sugar  
Syrup



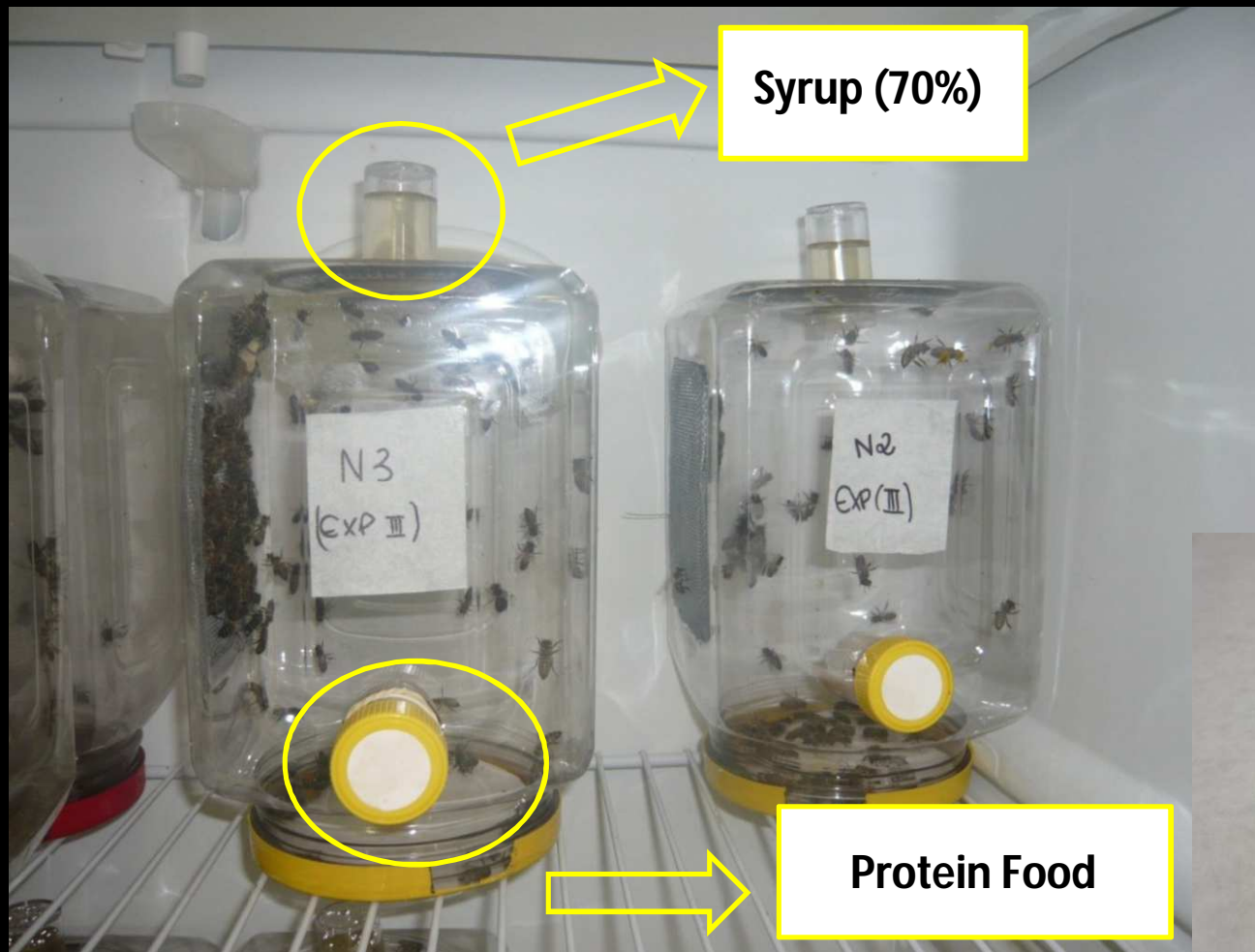
# 1 Removal of comb with new emerging bees and the introduction into the cages



Placing into an incubator

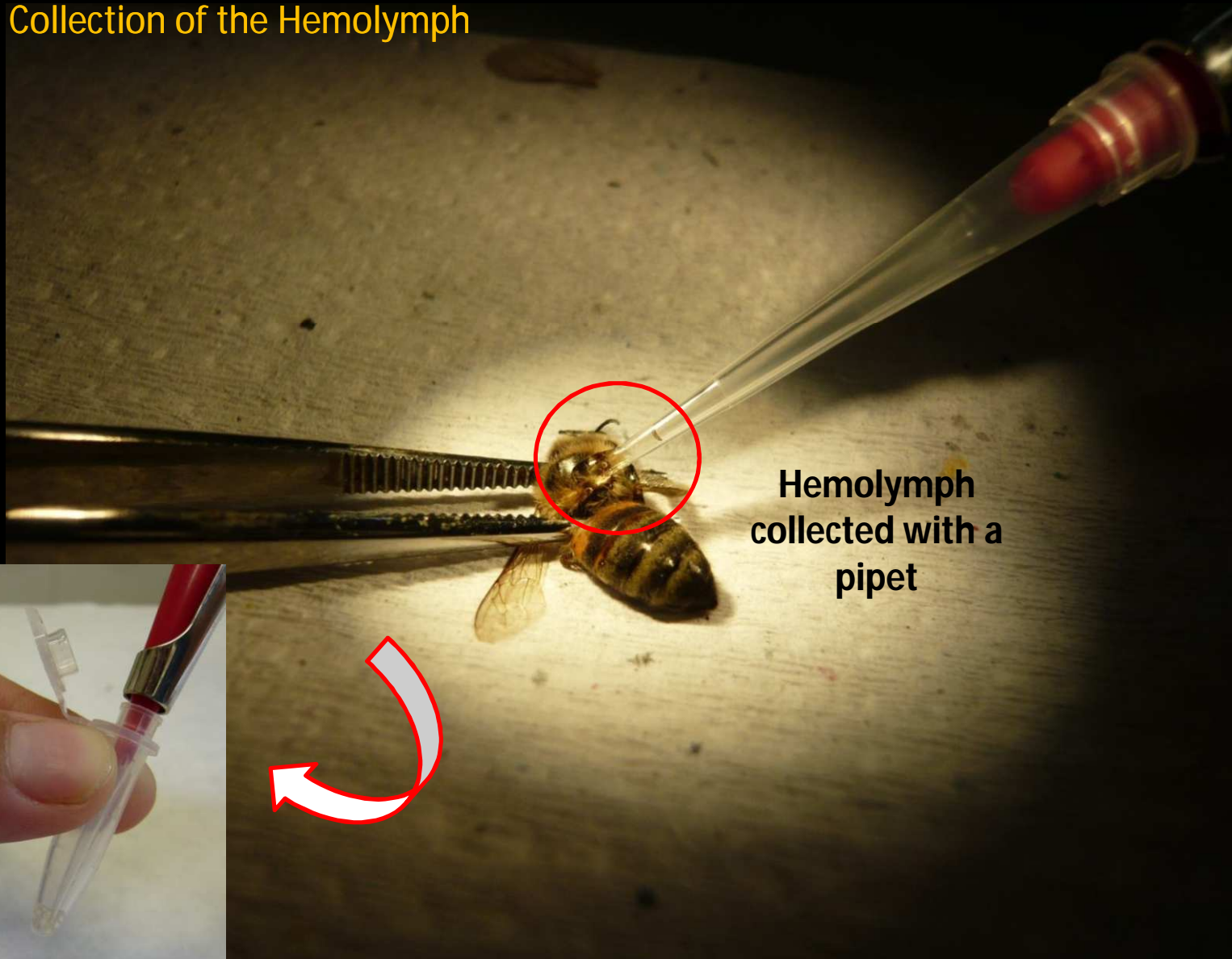


- 2 Newly emerged bees (100) collected from three different colonies, were mixed and placed into hoarding cages for seven days



3

### Collection of the Hemolymph

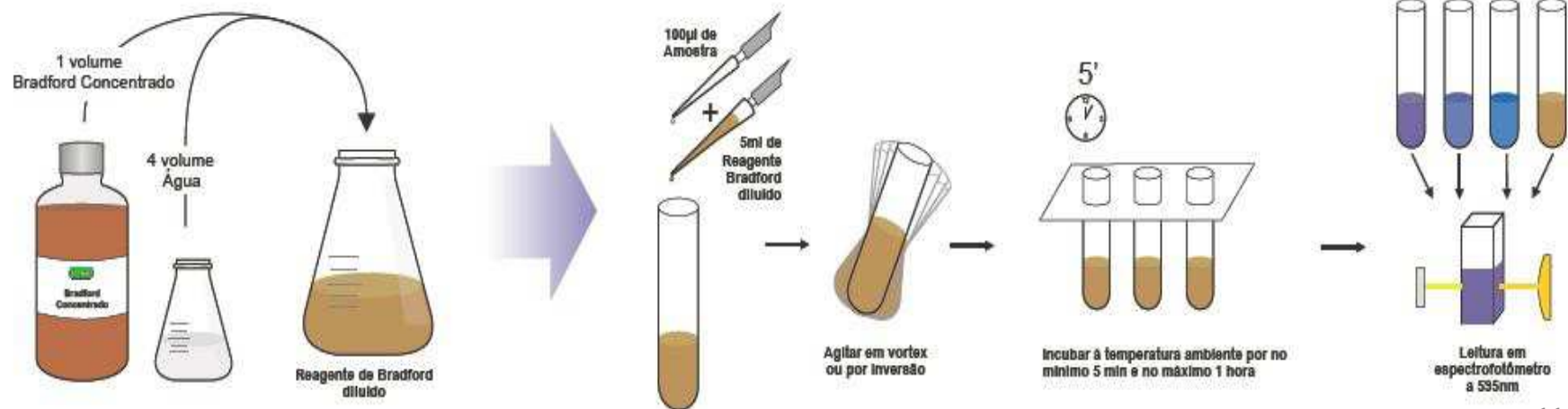


# Quantification of the total protein in the hemolymph

- Bradford Method (1976)
- Bovine Albumin
- Spectrophotometer 595nm



## Etapas do Método de Bradford



## DIETS

**D4**

30g soy milk  
10g albumin  
20g sugar  
syrup

**D5**

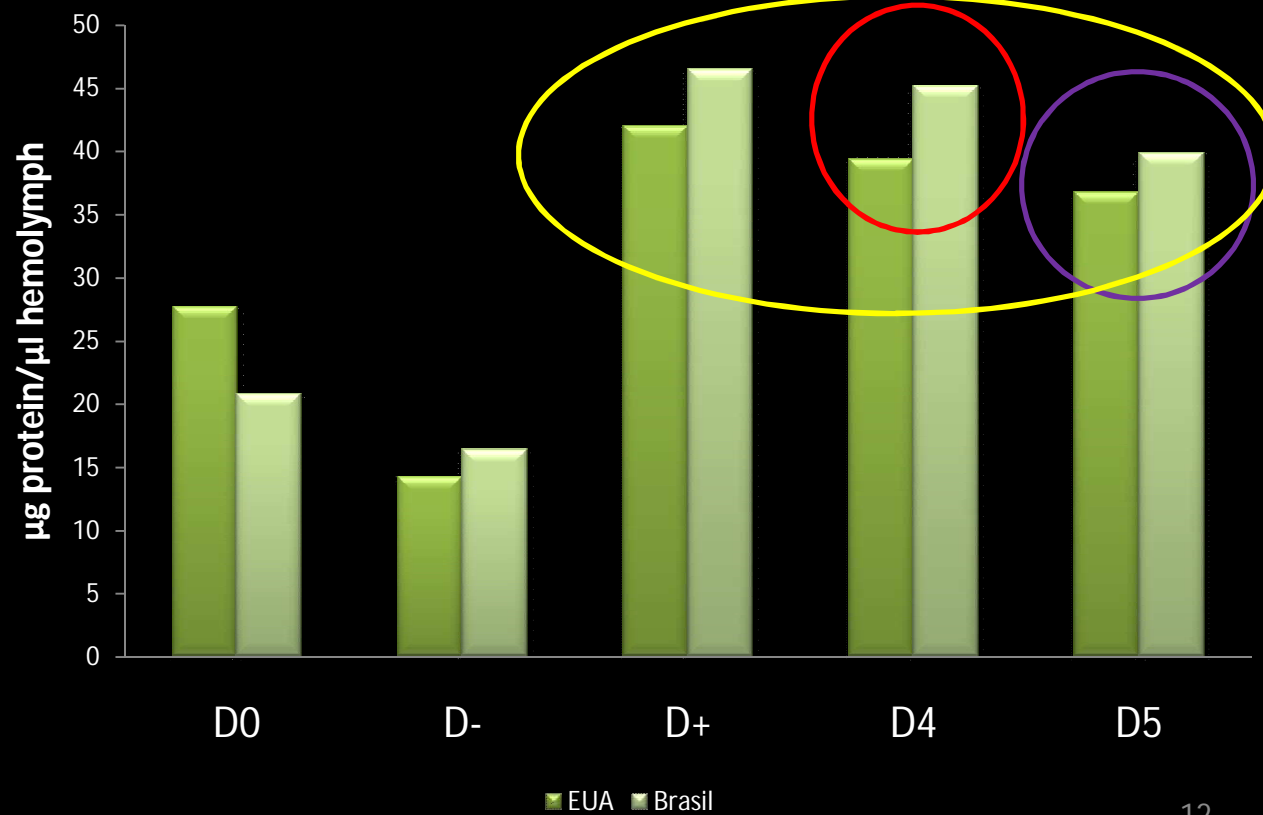
20g beer yeast  
20g soy milk  
10g rice meal  
20g sugar  
syrup

**D+**

Bee Bread  
in comb

**D -**

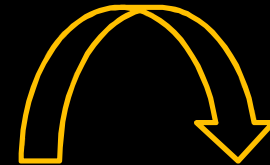
syrup 70%





# Evaluation of the colonies fed with artificial diets in the field

- 1 Tracked the colonies and verified the condition (for production of brood and food stores)



This map was done  
every 15 days for 45  
days

## 2 Weighing Colonies

Scale Monitors in the lab



scale

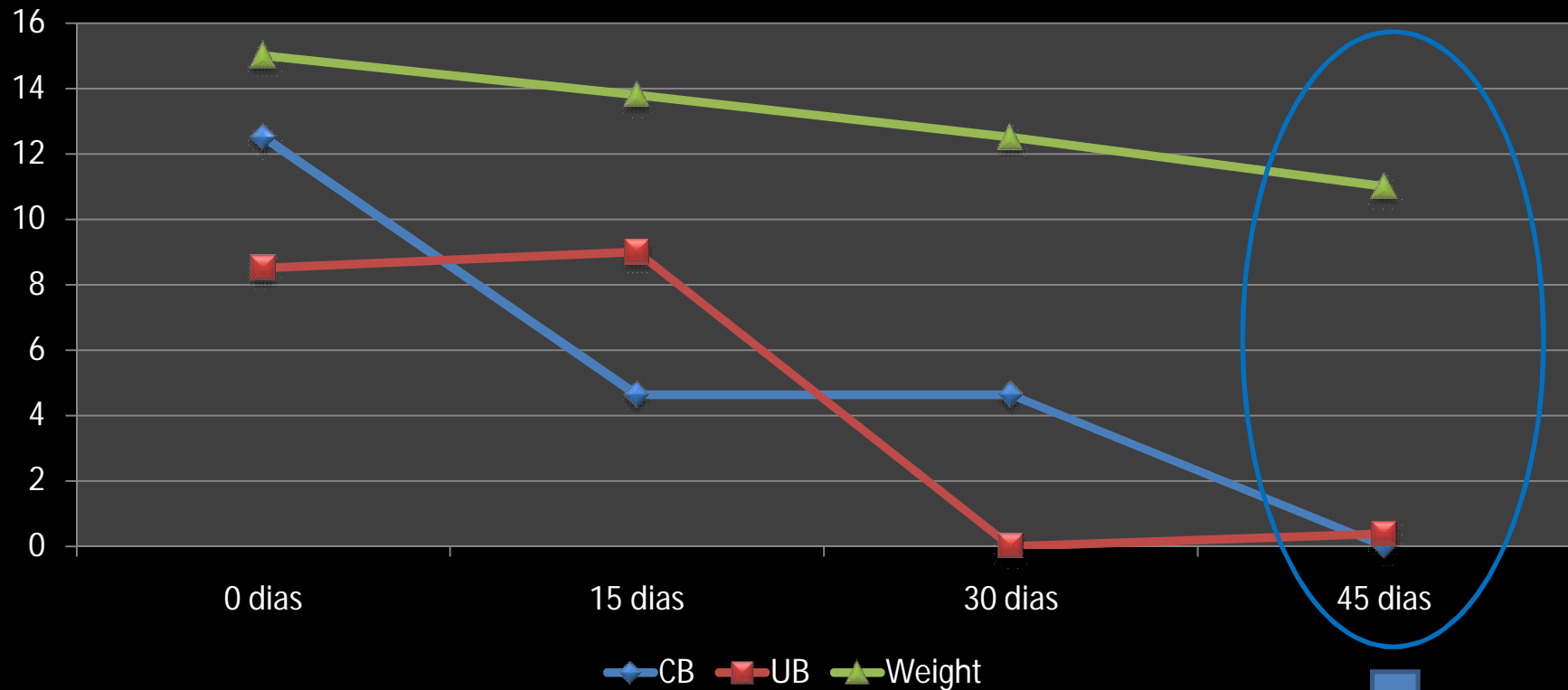


### 3 Quantity of Food Consumed





## Diets tested on bees in the field in Mossoró - RN



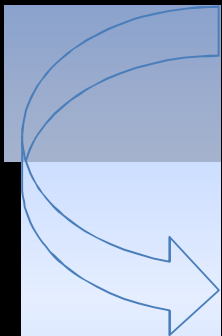
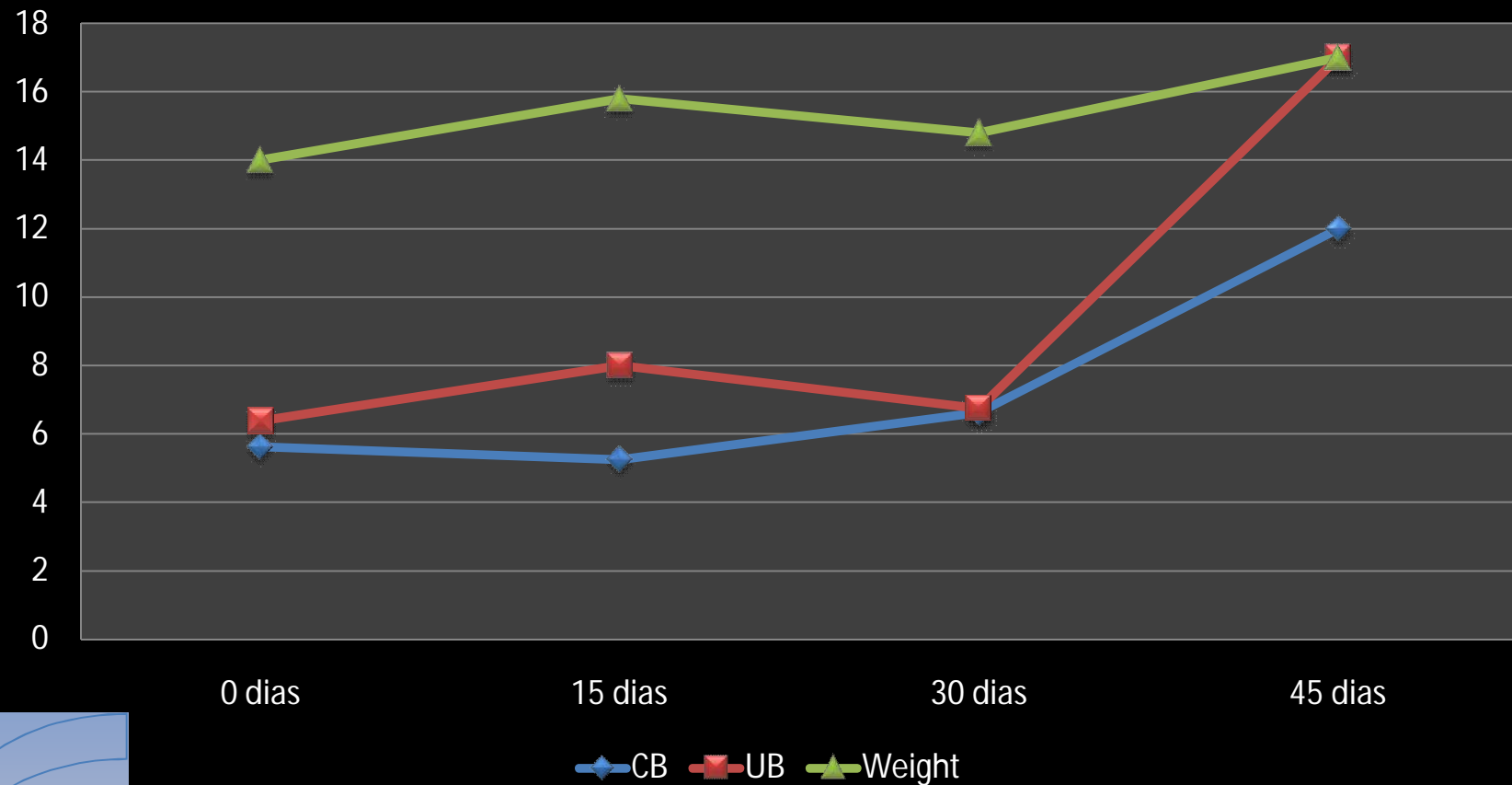
Swarming

**DID NOT RECEIVE ANY KIND OF ARTIFICIAL FEEDING**





## Diets tested on bees in the field in Mossoró - RN

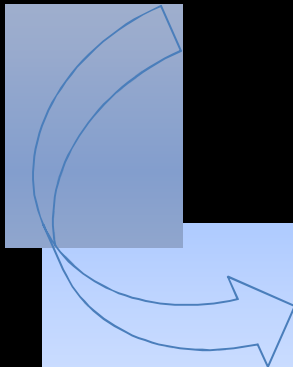
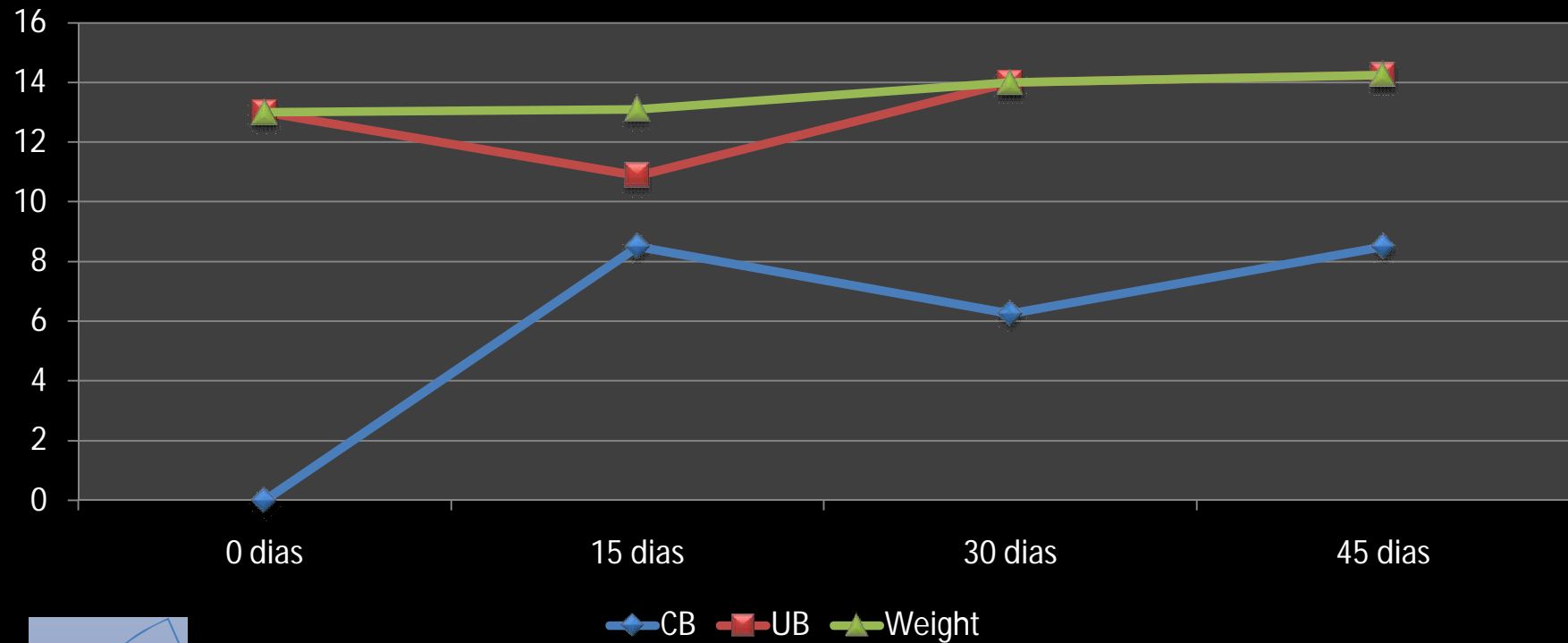


**DIET D4**  
Soy Milk  
Albumin  
Sugar  
Syrup

Consumed 70.5%



## Diets tested on bees in the field in Mossoró - RN



**DIET D5**  
Beer Yeast  
Soy Milk  
Rice Meal  
Sugar  
Syrup

Consumed 50.7%



This way, we conclude that the supplying of artificial diets during periods of lack of pollen is a good alternative to keep the colonies in good conditions until the environmental conditions get better



# Thank you!!!!

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