

DEVELOPMENT OF AFRICANIZED HONEYBEES (AHB) OF THE SEMIARID REGION OF RIO GRANDE DO NORTE-BRAZIL

Monitoring of hives placed in the sun and shade

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BRAZIL

MAP OF BRAZIL NORTHEAST STATES IN BLUE



CETAPIS
UFERSA
Mossoró-RN

APILAB
USP
Ribeirão Preto-SP

RACES OF HONEY BEES IN BRAZIL:1839 -2011

- ◆ *Apis mellifera mellifera*
- ◆ *Apis mellifera ligustica*
- ◆ *Apis mellifera carnica*
- ◆ *Apis mellifera scutellata* - 1956

AFTER THE INTRODUCTION OF THE SCUTELLATA BEE INTO BRAZIL IN 1956 THERE HAS BEEN A TREMENDOUS IMPACT ON BRAZILIAN BEEKEEPING. TODAY IN BRAZIL THERE IS NO OTHER BEES THAN AFRICANIZED HONEY BEES (AHB), A POLY-HYBRID BETWEEN THE INTRODUCED RACES ABOVE MENTIONED.

HONEY PRODUCTION

⇒ HONEY PRODUCTION: SINCE 2000 MORE THAN 50,000 TONS/YEAR

⇒ NO CONTAMINATION OF HONEY AND WAX

⇒ BRAZIL BECAME HONEY EXPORTER SINCE 2001

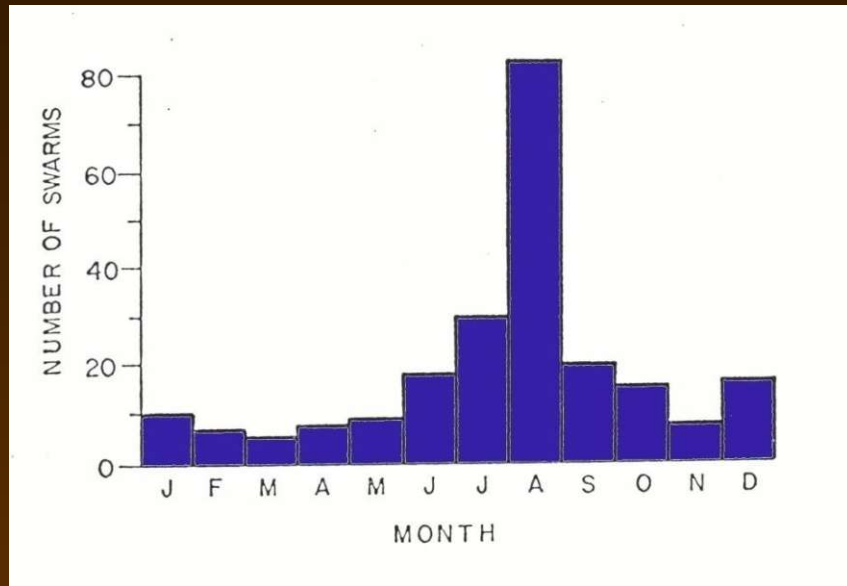
⇒ 2006 to 2010= EXPORTED 25.000 TO 35.000 TONS OF HONEY/YEAR (NORTHEAST >30%).

⇒ ORGANIC HONEY IS TODAY THE MOST IMPORTANT BEE PRODUCT EXPORT.

Commercial beekeepers produce on average 35 kg of honey/colony/year, though in some migratory operations the averages are > 100 kg. Northeast Brazil is responsible today for 30% of honey exportation. However, in this region they loose every year >50% of their hives due swarming behavior (absconding).



SWARMING BEHAVIOR OF AHB



Frequency of swarms during the year in Northeast Brazil (> 50%)



Trap nest in a tree

AHB MIGRATE (ABSCOND) FREQUENTLY EVEN IN THE PRESENCE OF BROOD AND FOOD.

**AN COMMON APIARY DURING DRY SEASON IN
NORTHEAST BRAZIL .THE HIVES ARE PLACED
NORMALLY DIRECT UNDER THE SUN**



MAIN CAUSES OF THE ABSCONDING BEHAVIOR

▪ BIOTIC FACTORS

Genetics

Pheromones

Diseases

Population size

Stress

Recruitment systems

▪ ABIOTIC FACTORS

Rainfall

Drought

Humidity

Food

Temperature

EQUIPMENTS USED TO INDUCE ABSCONDING OF AHB

Climatic Chamber with Apidometers



Outgoing
sensor



Incoming
sensor

Experiments on Swarm Behavior were done in CETAPIS-RN
UFERSA (Mossoró-RN) and in APILAB-USP (Ribeirao Preto-SP)

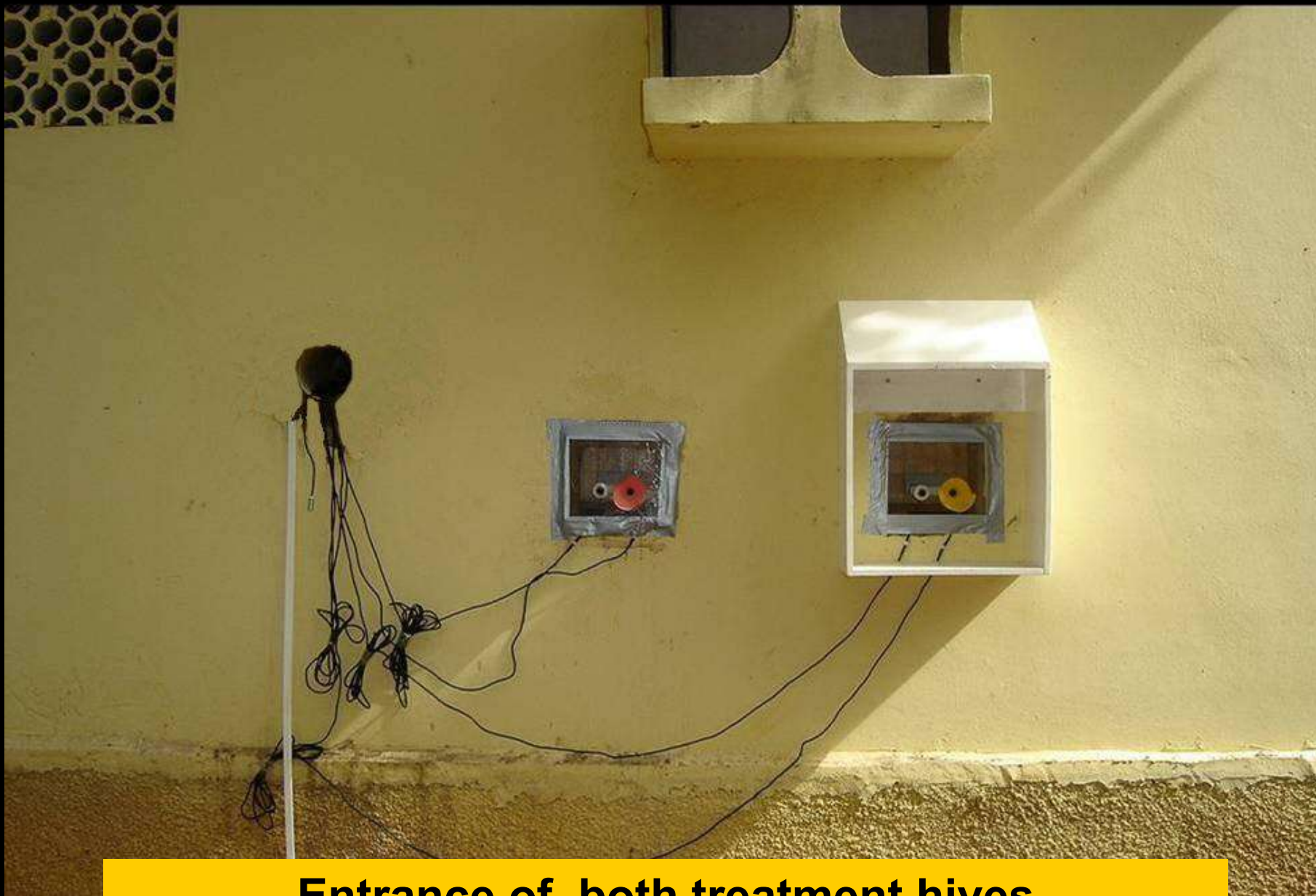
In each place were used 5 colonies of AHB

**3 Control Mating Hives placed
outside the building**



**2 Treatment Mating Hives inside the
Climatic Chamber. The hive in the
center had only climatic sensors**

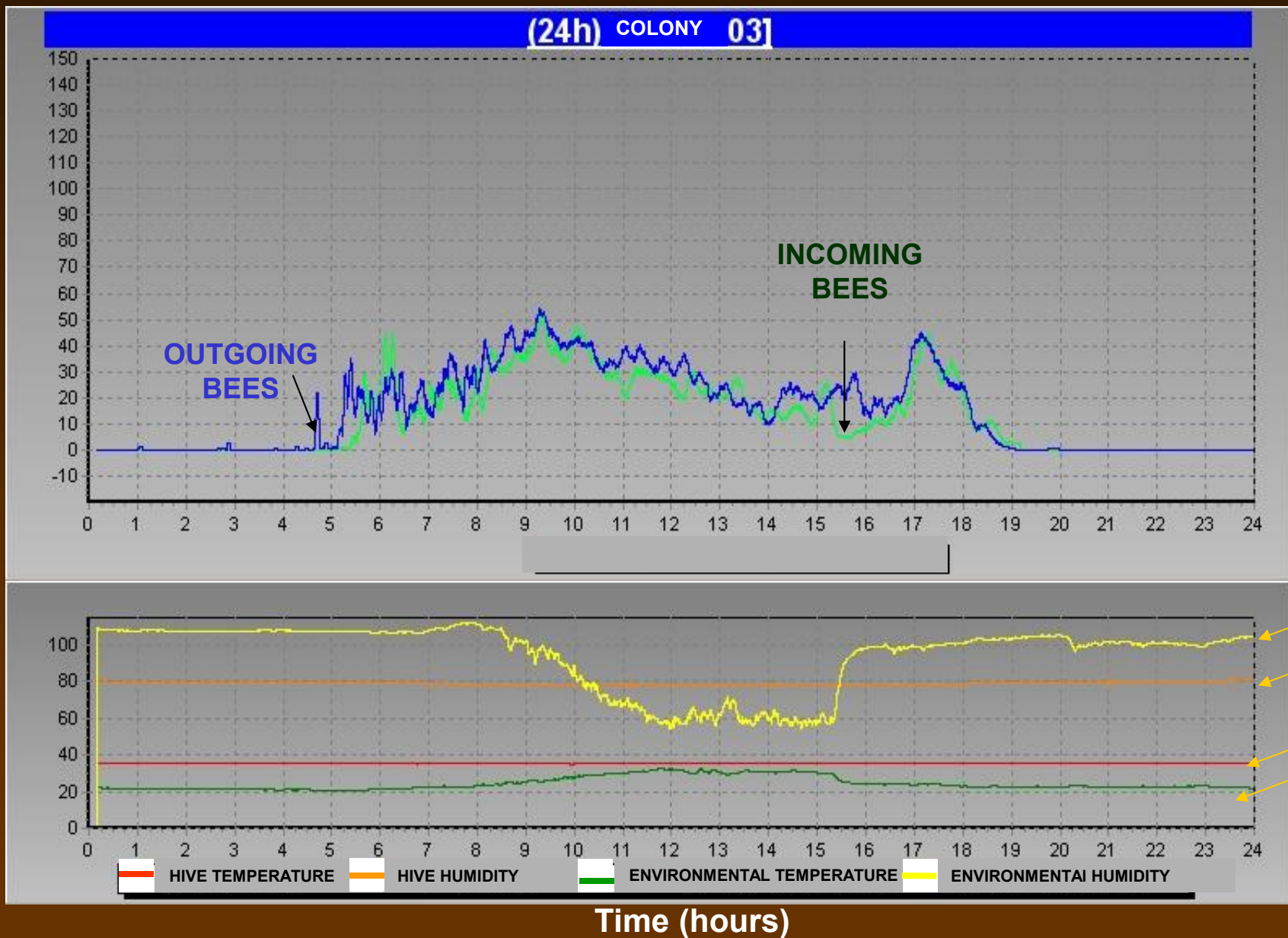




Entrance of both treatment hives

MONITORING OF EACH HIVE – DAILY REGISTER OF THE OUTGOING AND INCOMING BEES

Bees Number

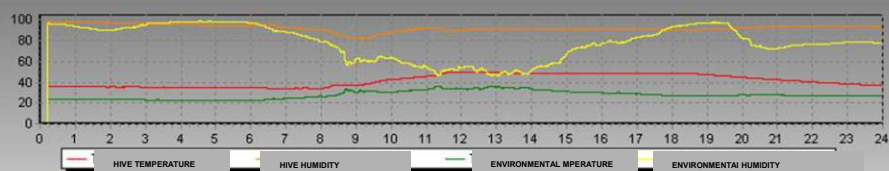
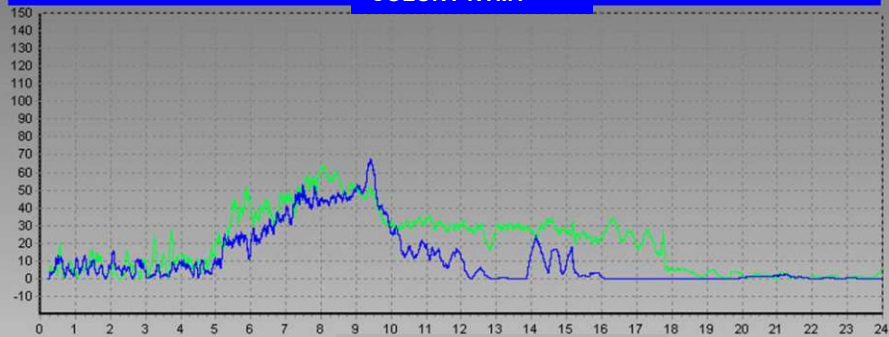


COLONIES DATA DURING AND AFTER ABSCONDING INDUCED BY HIGH TEMPERATURES

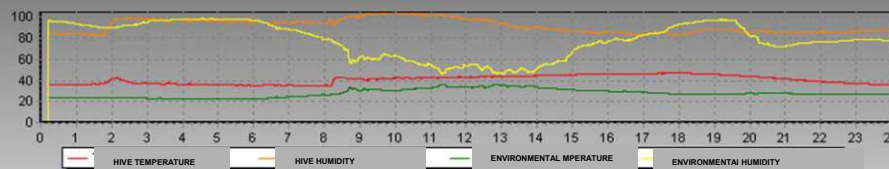
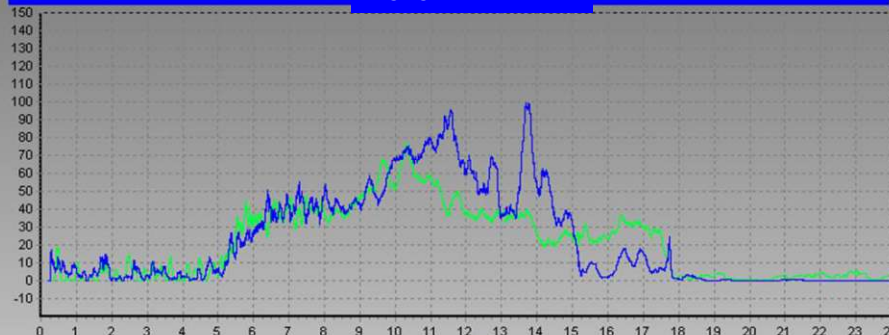
DURING

AFTER

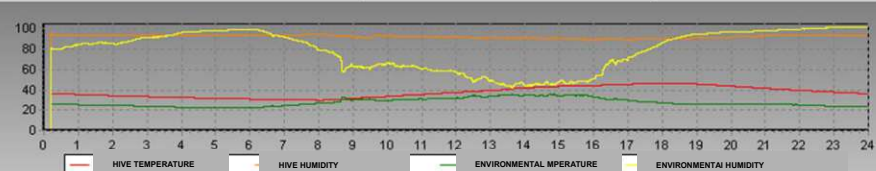
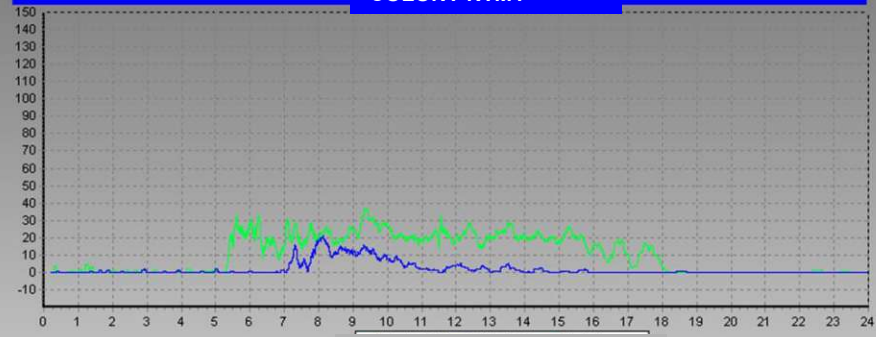
COLONY NTM1



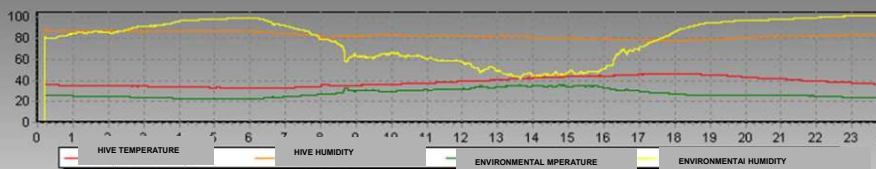
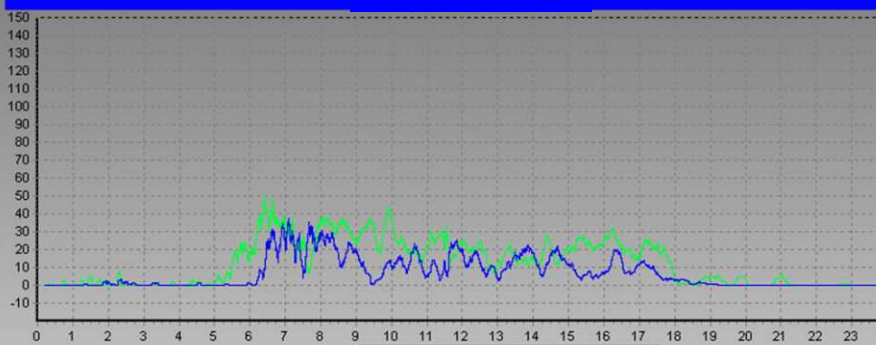
COLONY NTM2



COLONY NTM1



COLONY NTM2





CLUSTERS OF AHB BEFORE AND DURING ABSCONDING





ABSCONDING EHAVIOR OF AHB IN NORTHEAST BRAZIL (MOSSORÓ-RN)



EXPERIMENTS DONE ON SWARMING BEHAVIOR BY OUR GROUP DEMONSTRATED THAT HIGH TEMPERATURES ($> 41^{\circ}\text{C}$) PROVOKE EXIT IN MASS (ABSCONDING) OF ALL AHB INDIVIDUALS, LEAVING BROOD, FOOD AND EVEN THE QUEEN (ABSCONDING) IN NORTHEAST BRAZIL. THE HONEY BEES, LIKE THE HUMANS, DO PREFER FRESH WATER AND SHADE DO DEVELOP THEIR COLONIES.



**COLONIES OF AHB PLACED IN SHADE UNDER
CARNAUBA LEAVES NEAR APODI-RN**



OBJECTIVES

AS FAR AS THE HIGH TEMPERATURE (MORE THAN 41° C) INDUCES ABSCONDING OF AHB WE DECIDED TO MONITORING THE ACTIVITIES OF THE BEES INSIDE THE COLONIES PLACED DIRECT UNDER THE SUN AND COLONIES PLACED IN SHADE.

MATERIAL AND METHODS

TWO GROUPS OF 10 LANGSTROTH HIVES OF AHB WERE USED IN THIS EXPERIMENT : COLONIES PLACED DIRECTLY UNDER THE SUN AND COLONIES IN SHADE UNDER PROTECTION (CARNAUBA LEAVES)



UFERSA-Experimental
Station –Mossoró-RN

METHODOLOGY:

The population size of each hive was estimated every month and the 5 most populated colonies of each group were selected for inspections every 10 days from August 2010 to February 2011 (11 inspections) and the following area (%) were recorded:

A-Oviposition area; B-Uncapped brood area;C-Capped brood area;D-Pollen area;E-Honey area.



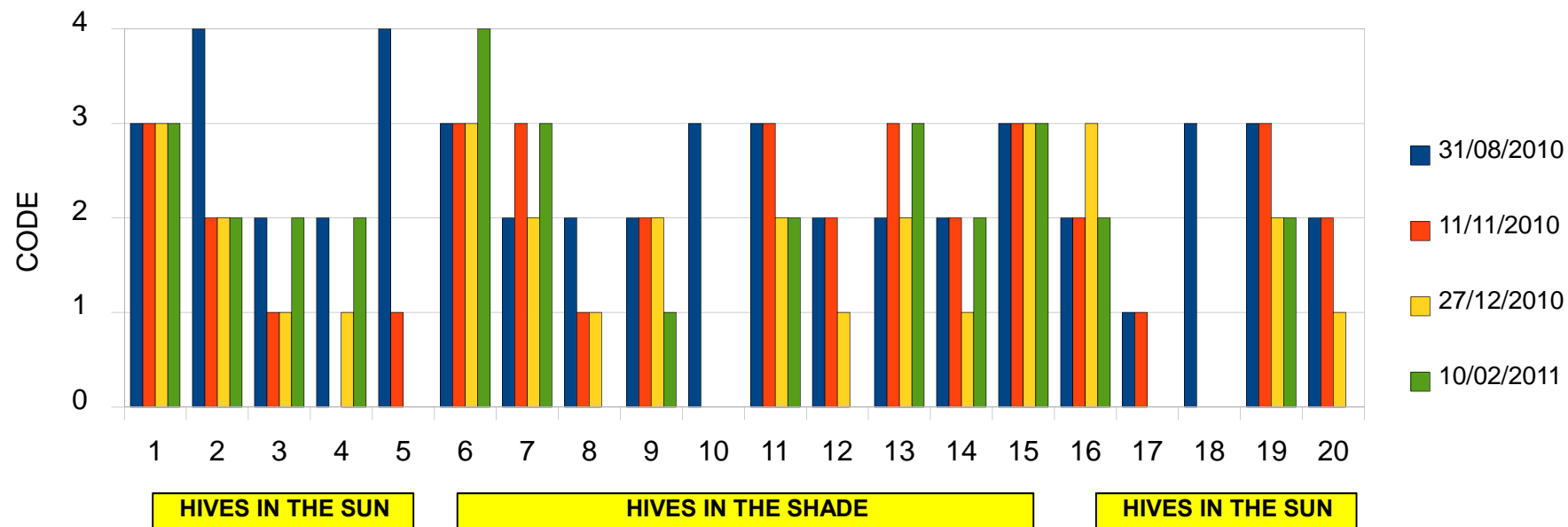


**Colonies
placed in the
sun**



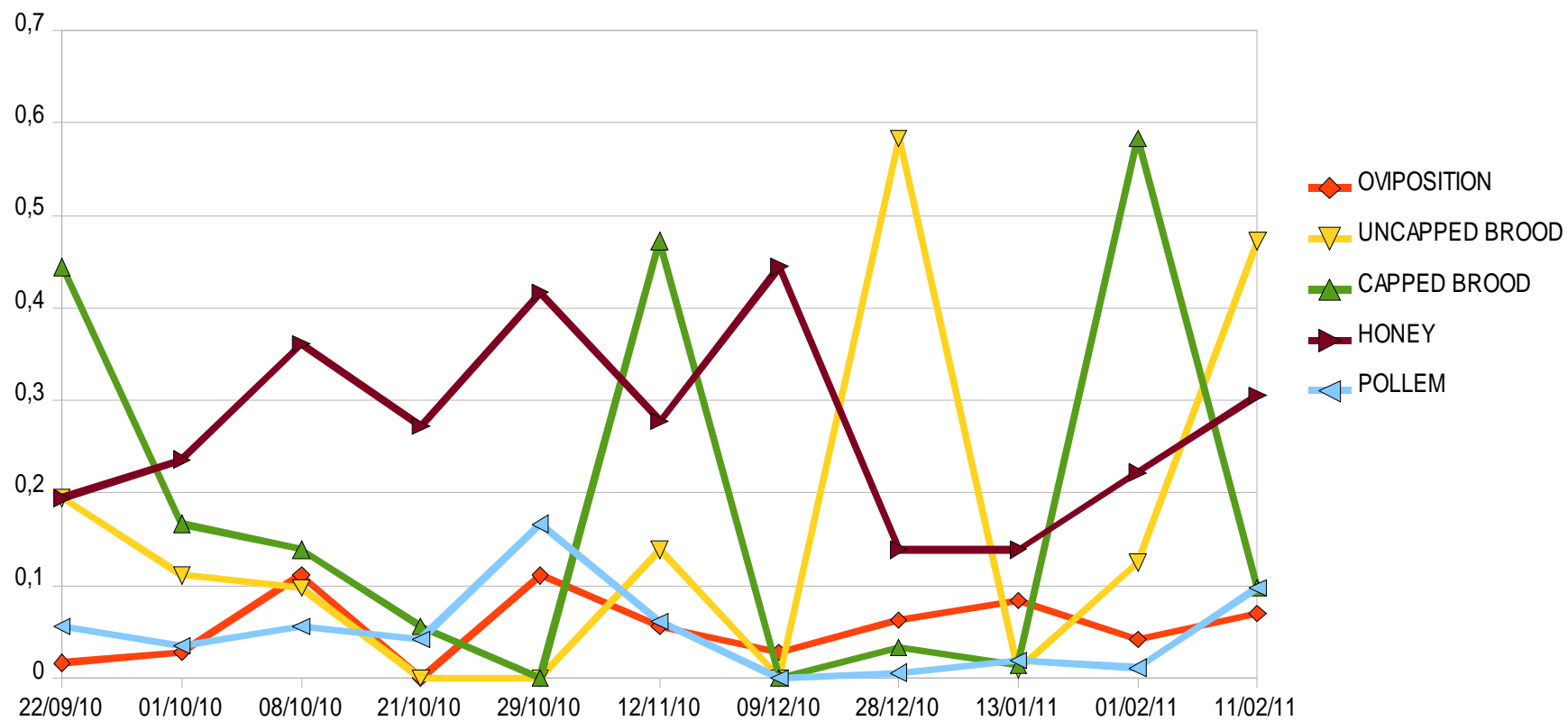
**Colonies
placed in
shade**

HIVE POPULATION

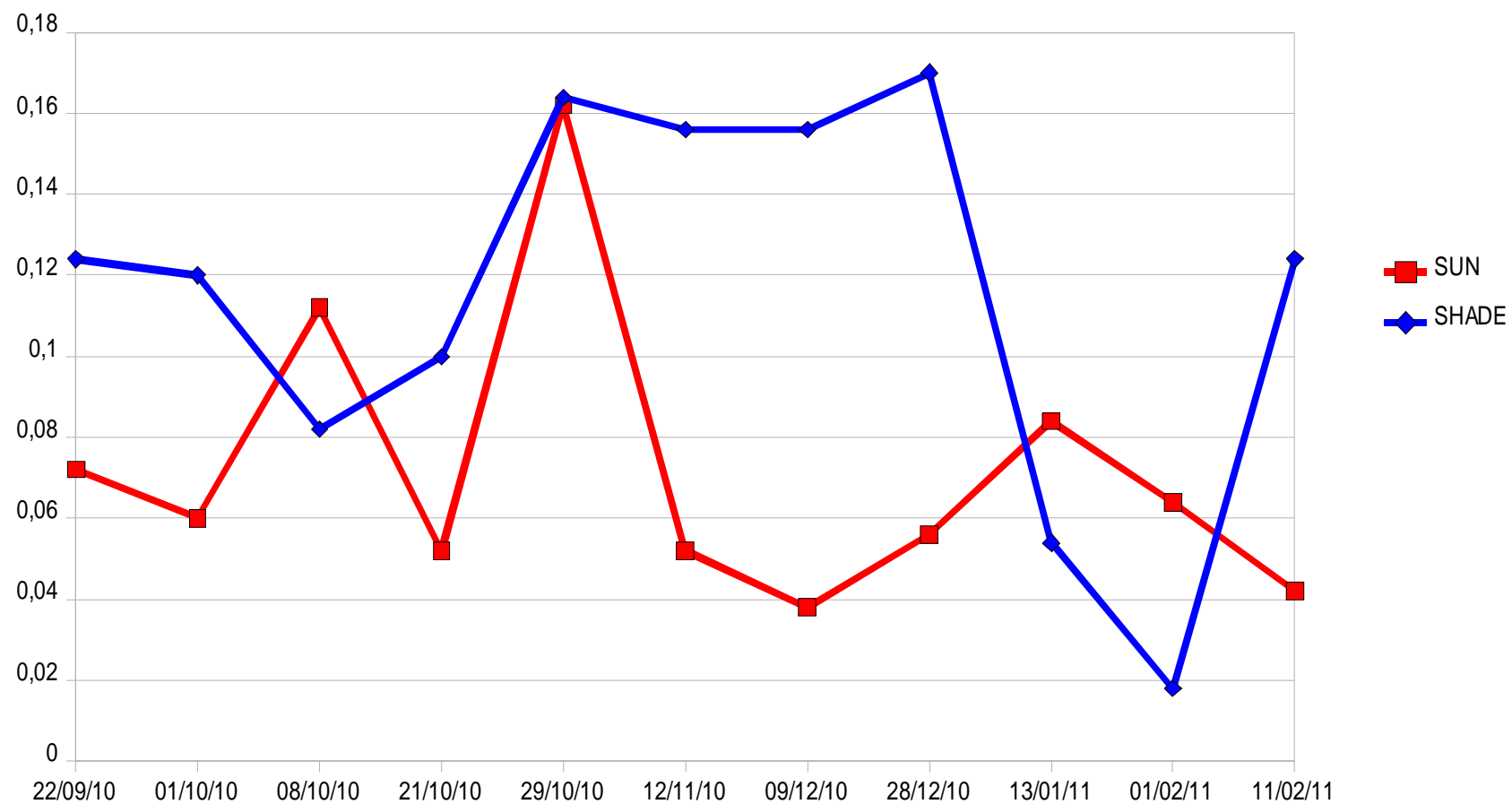


CODE	POPULATION SIZE
0	NO BEES
1	POOR (> 500 to 5.000 bees)
2	FAIR (> 5.000 to 10.000 bees)
3	GOOD (> 10.000 to 20.000 bees)
4	VERY GOOD (> 20.000 to 40.000 bees)

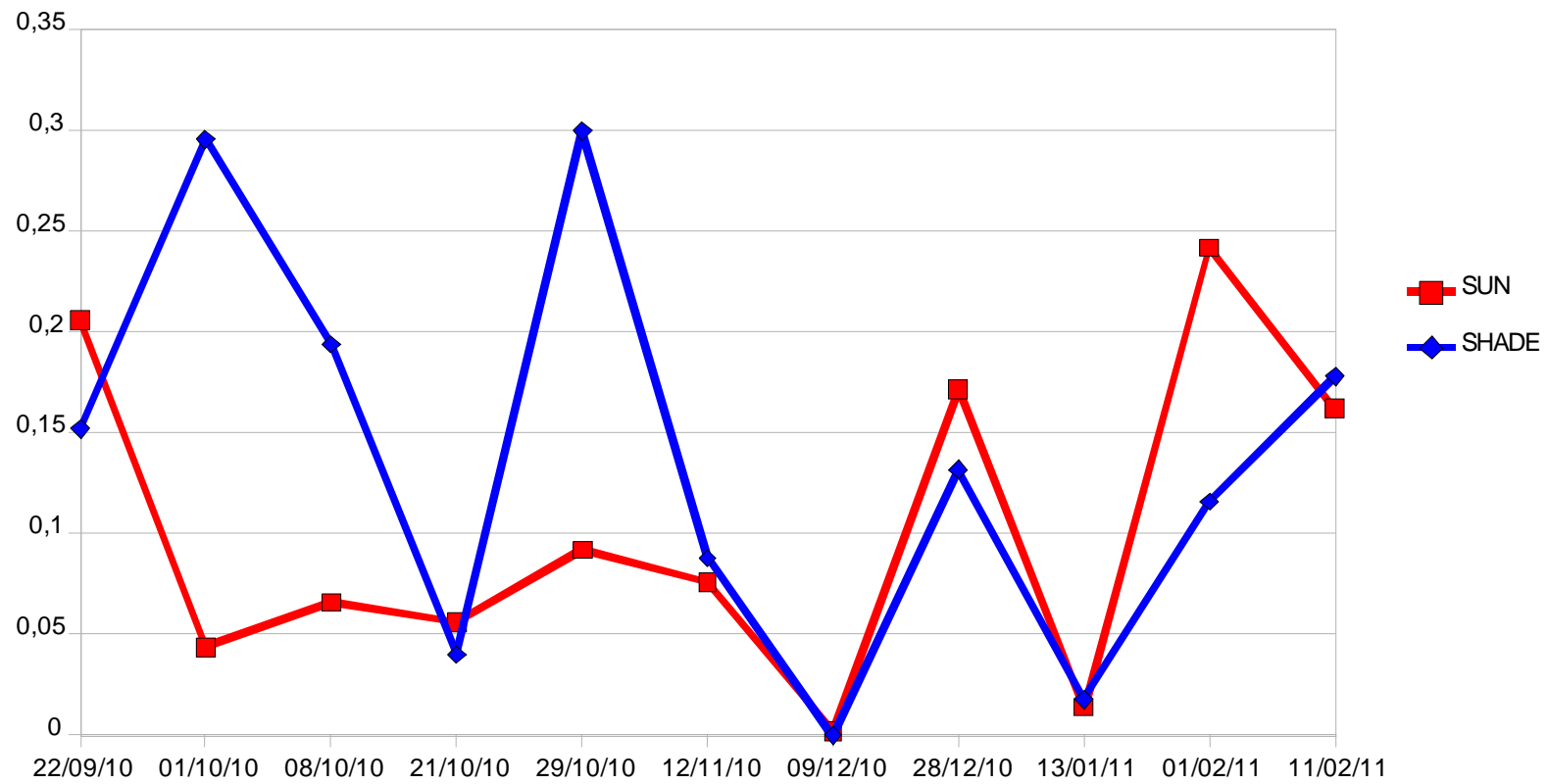
HIVE 02



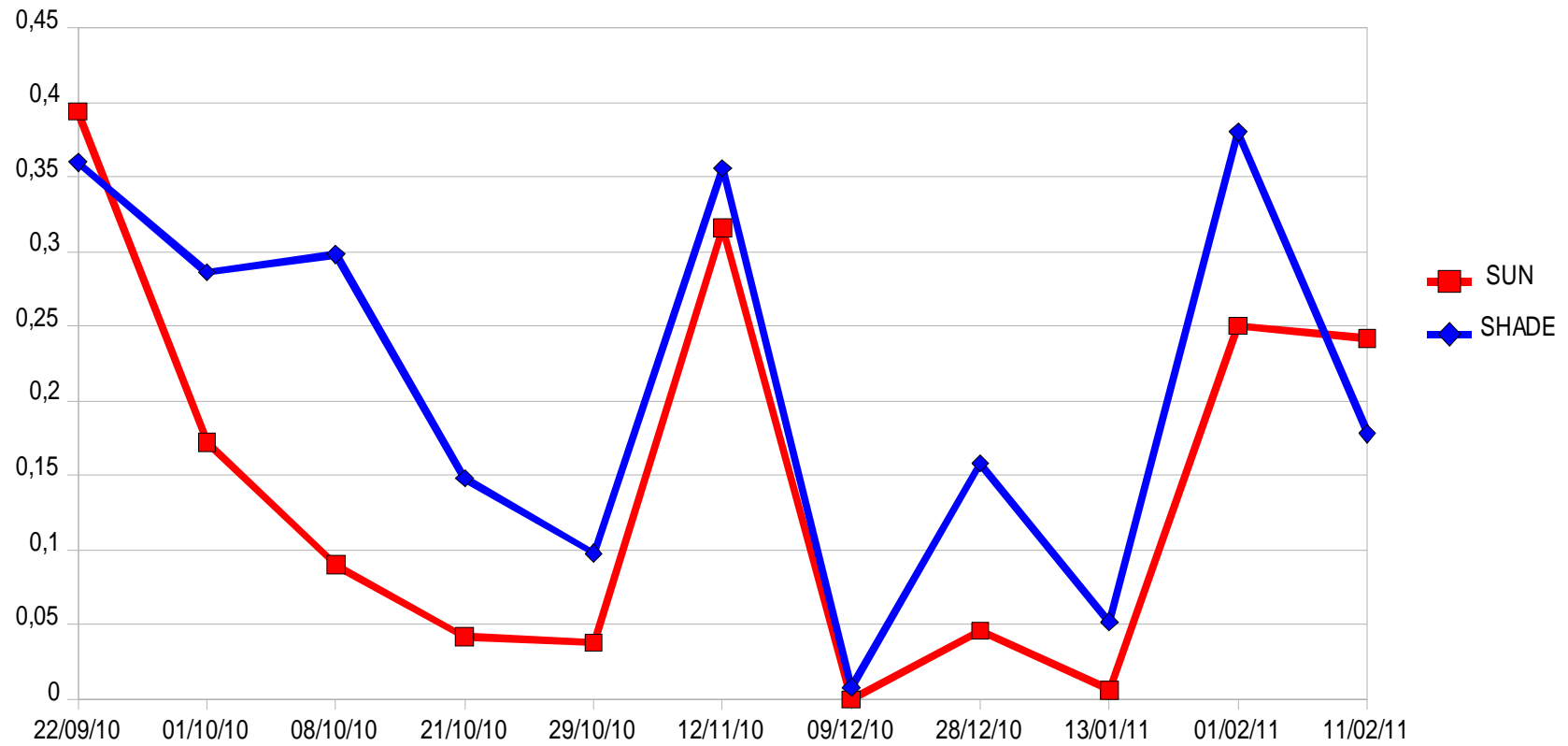
OVIPOSITION AREA



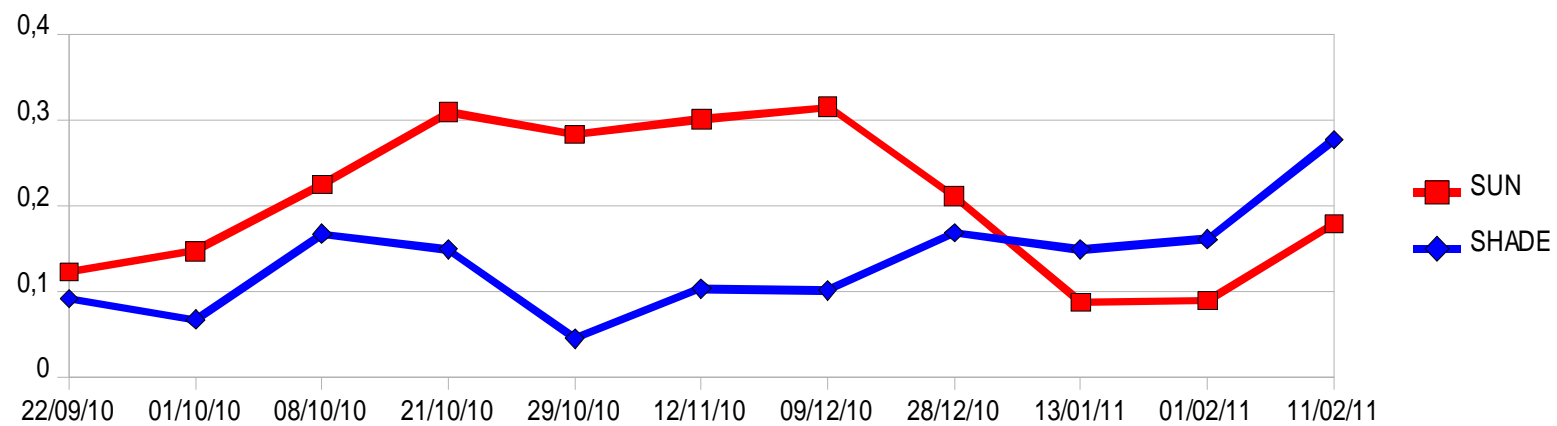
UNCAPPED BROOD AREA



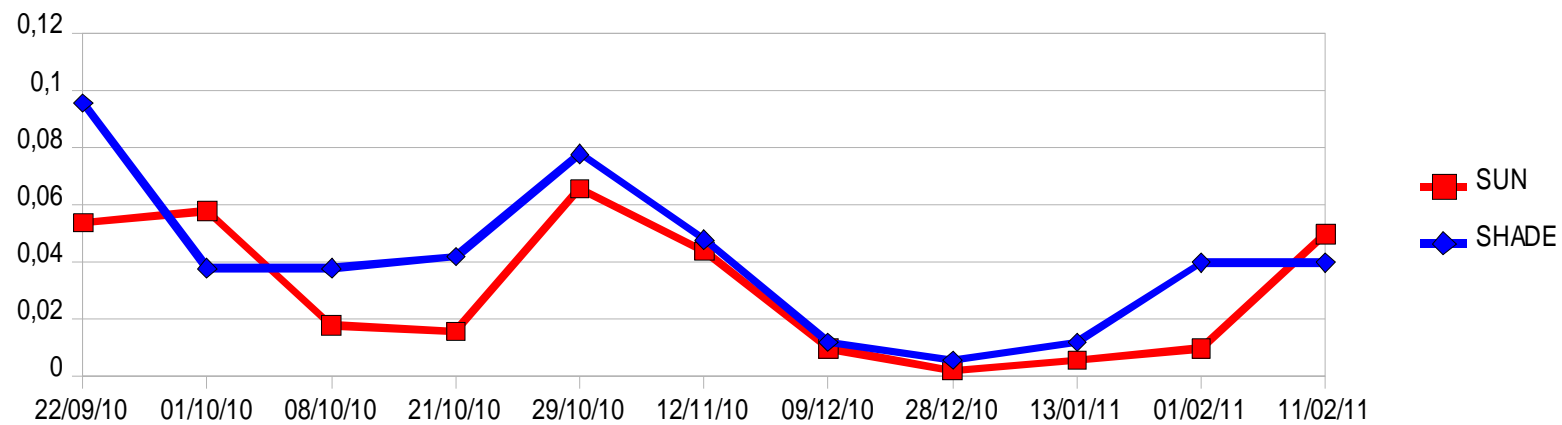
CAPPED BROOD AREA



HONEY AREA



POLLEM AREA



MAIN CONCLUSIONS

1- During the period observed (August 2010 to February 2011) it was registered an average reduction of 38% in the population of bees of both group of hives.

2- Population reduction of hives during the period:

Hives in the shade= 25% ; Hives under the sun= 50%

3-The oviposition, open brood and capped brood areas of the hives maintained directly under the sun were more affected than the hives in the shade. The area of honey was higher in the colonies under the sun but the nectar flow was very poor.

4- The AHB had a better development in the shade than under the action direct of the sun. We do recommend to place the hives in the shade and preferentially provided with fresh water .

THANK YOU

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