

Effects of IMIDACLOPRID (a neo-nicotinoid insecticide) on honey bees

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Direct effects of poisoning classical pesticides





Indirect effects

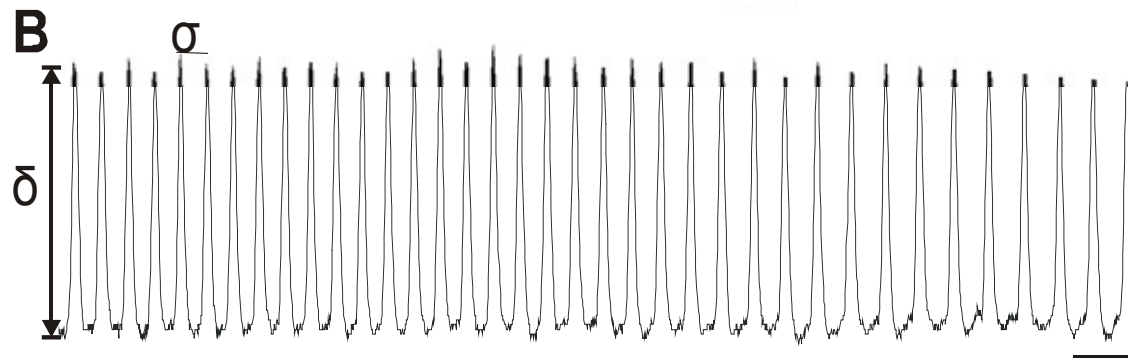
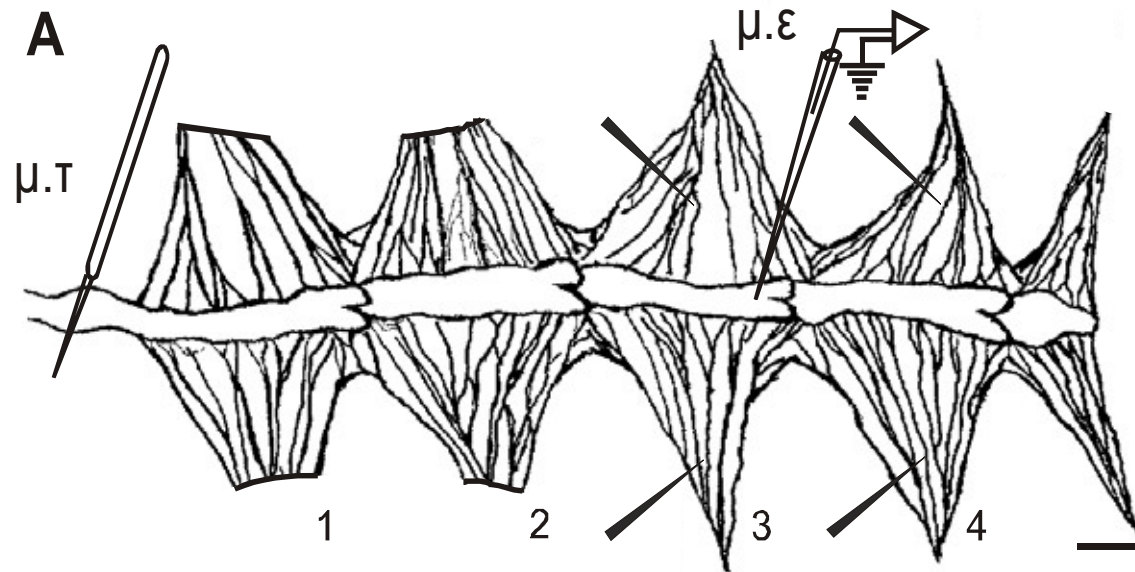
Classical pesticides- neo-nicotinoids

- Stop of egg laying
- aggressiveness
- Reduce of orientation ability
- Reduce of hygienic behaviour
- Reduce of memory ability
- Hypothermia
- Brood intoxication
- Reduce of productivity
- Reduce function of the heart, glands
- Damage in parts of the bee brain



The heart of the honey bee

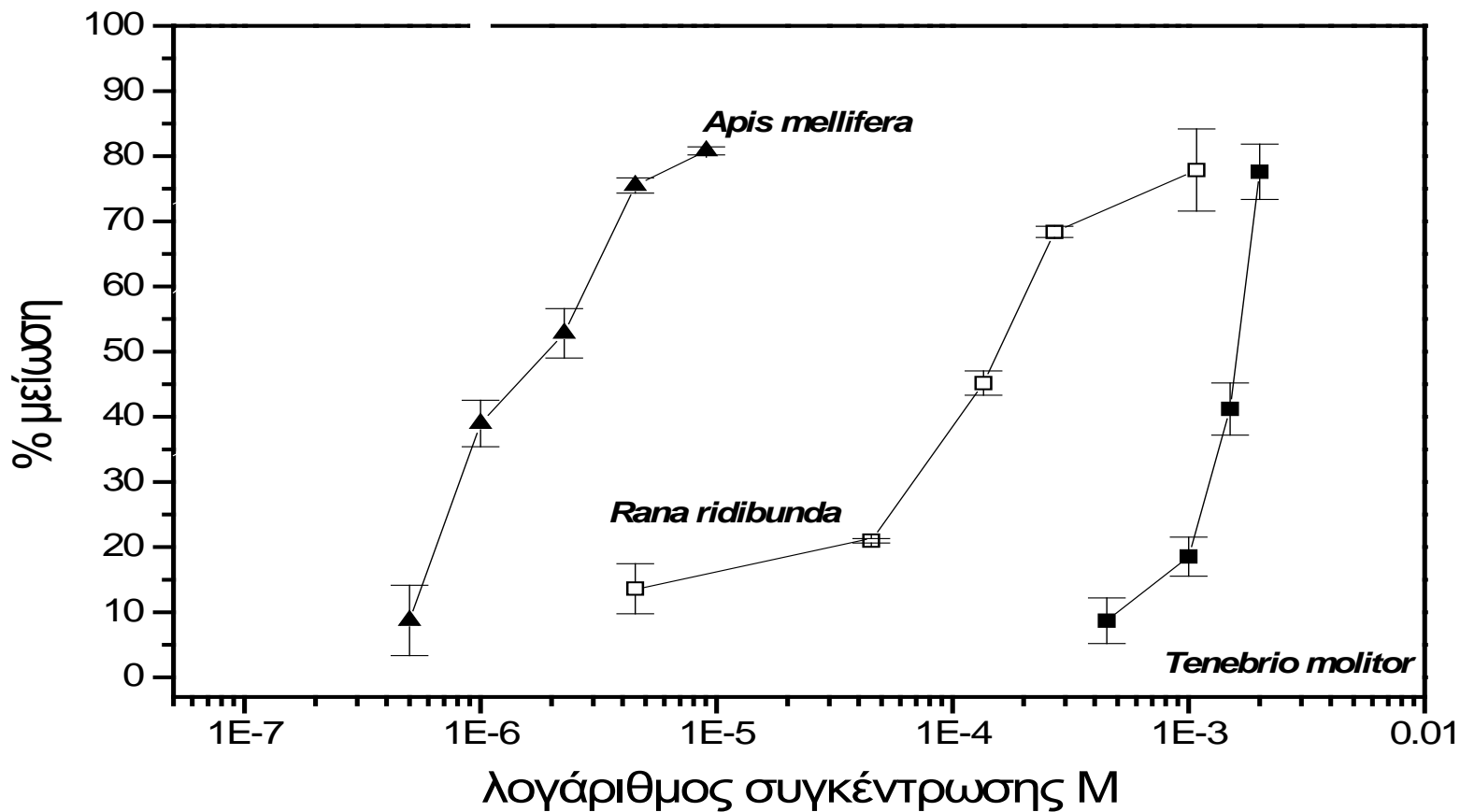
(Team of George. Theophilidis, Greece)





Effect on the heart (2,4 D)

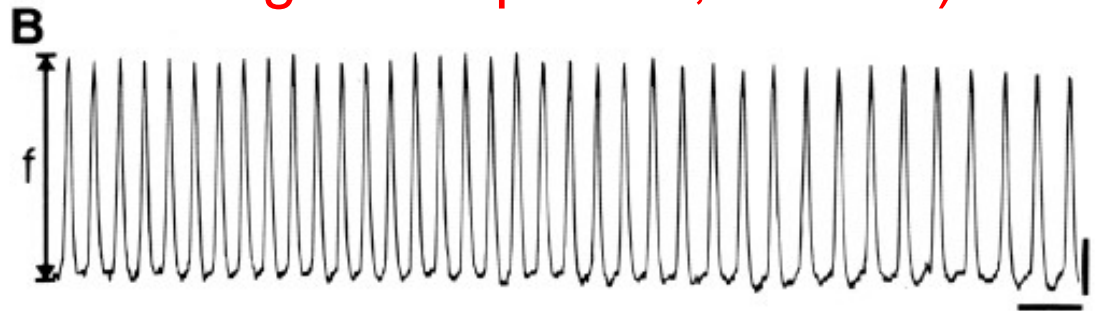
(Team of George Theophilidis, Greece)



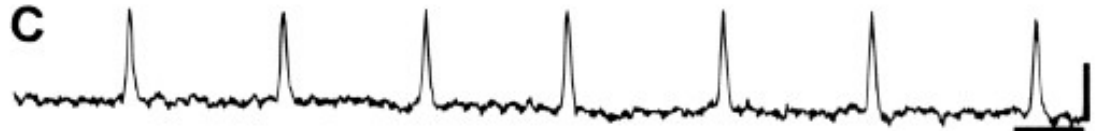


The heart of the honey bee (Team of George Theophilidis, Greece)

Deltamethrin



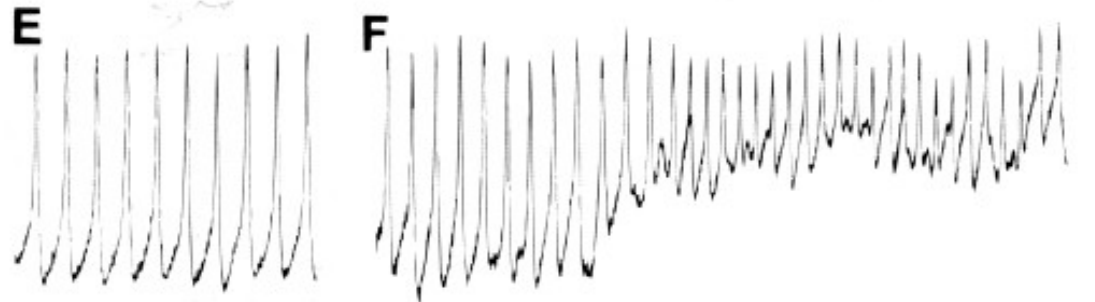
Normal heart
function



after 10 min



after 18 min





Current project in Institute of Apiculture

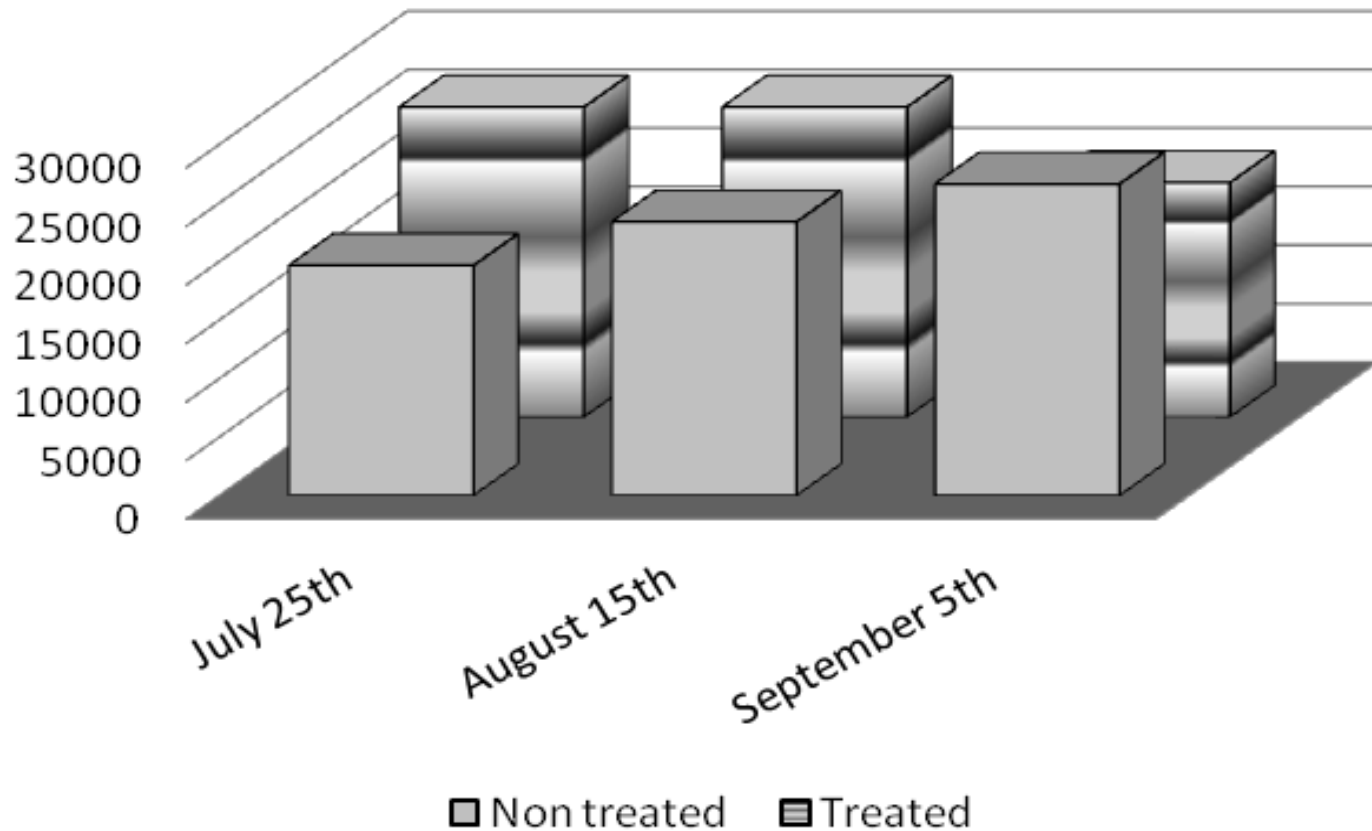
- Dir. 797/04 EC

on the evaluation of the effects of the
neonicotinoid imidacloprid on honey
bees

(field tests, tunnel tests and hoarding
cages tests)



Field experiment in cotton





Imidacloprid residues in cotton fields

Sample Type	Type of field	Concentration of Imidacloprid (ng/g)
Honey bees	Untreated	nd*
	Treated	8.79
Honey	Untreated	nd*
	Treated	7.42
Pollen	Untreated	nd*
	Treated	5.68

Tunnels- bee counters





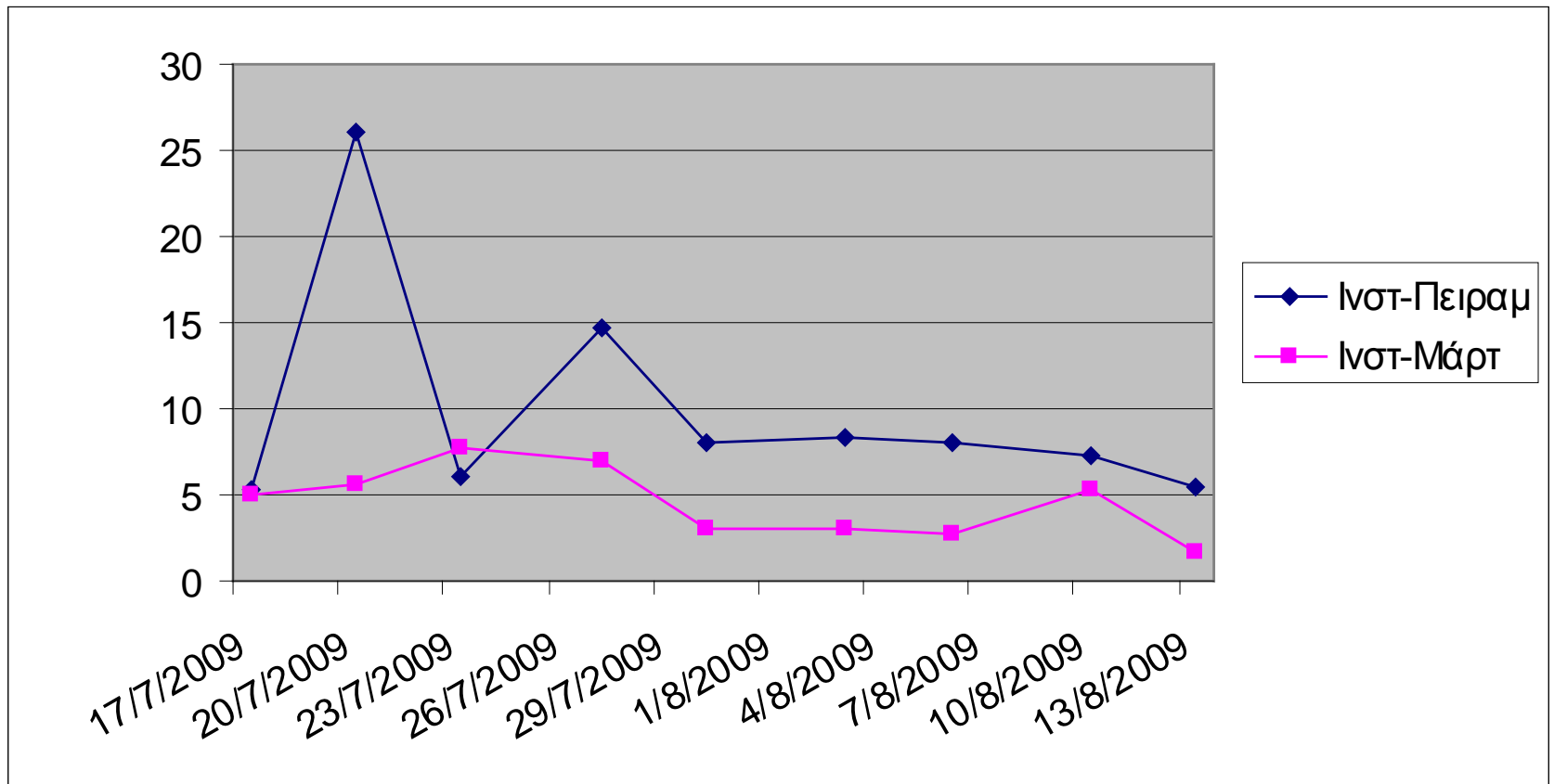
Semi-field /tunnels experiment

- Give pollen in the hive with 3 ppb imidacloprid
- Give sugar solution with 2ppb imidacloprid



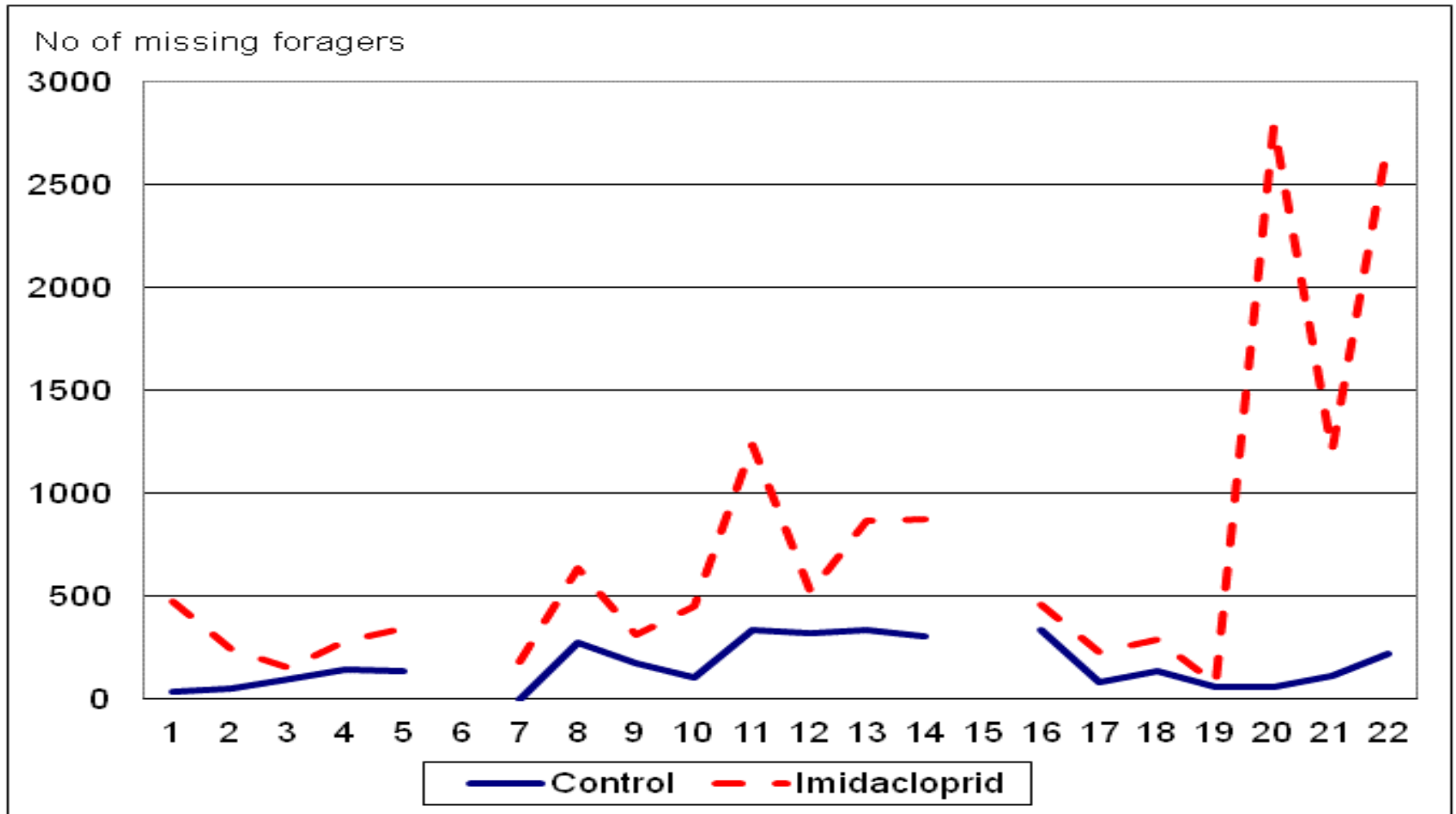


Dead bees in front of the colonies



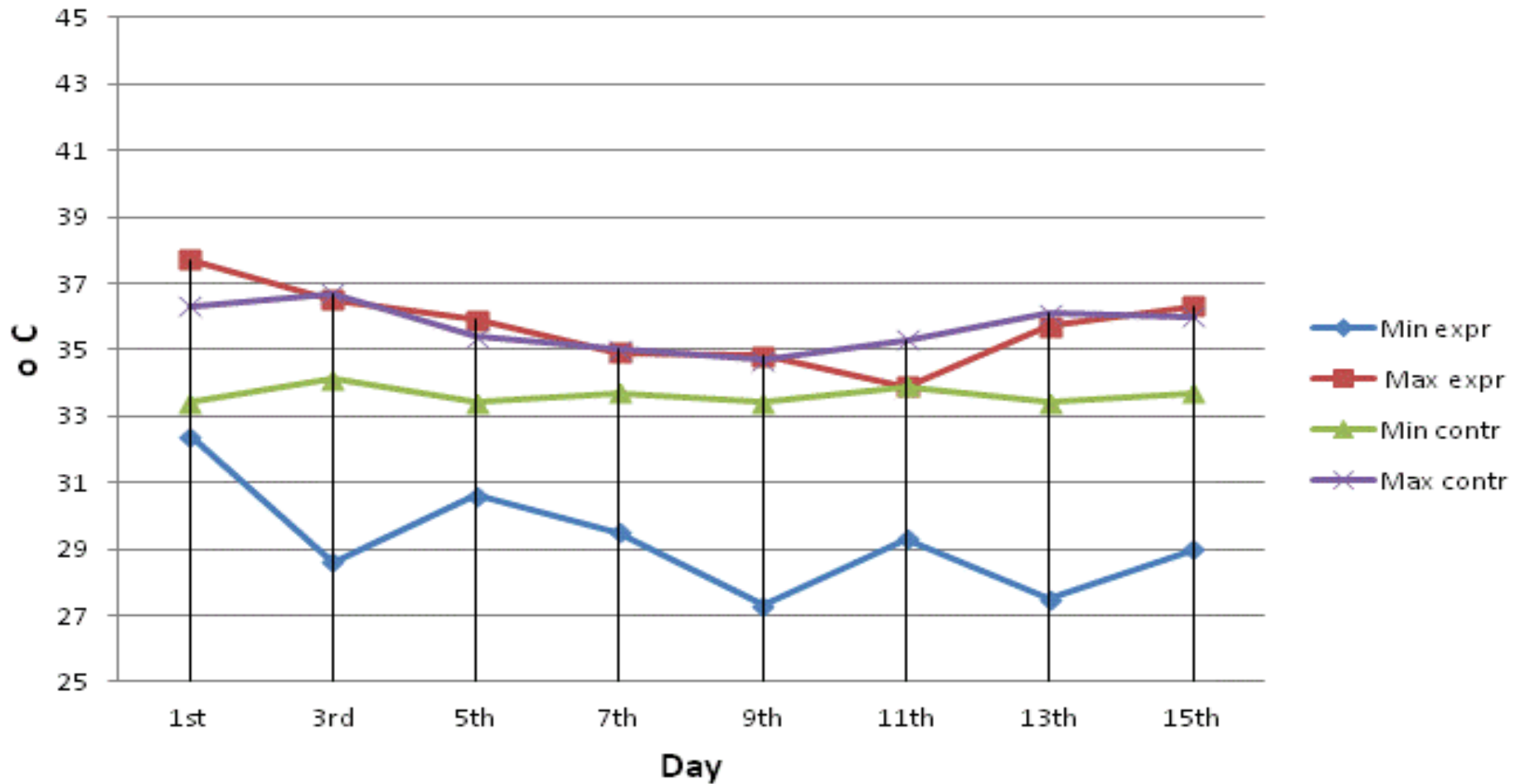


Missing foragers? Where do they go?





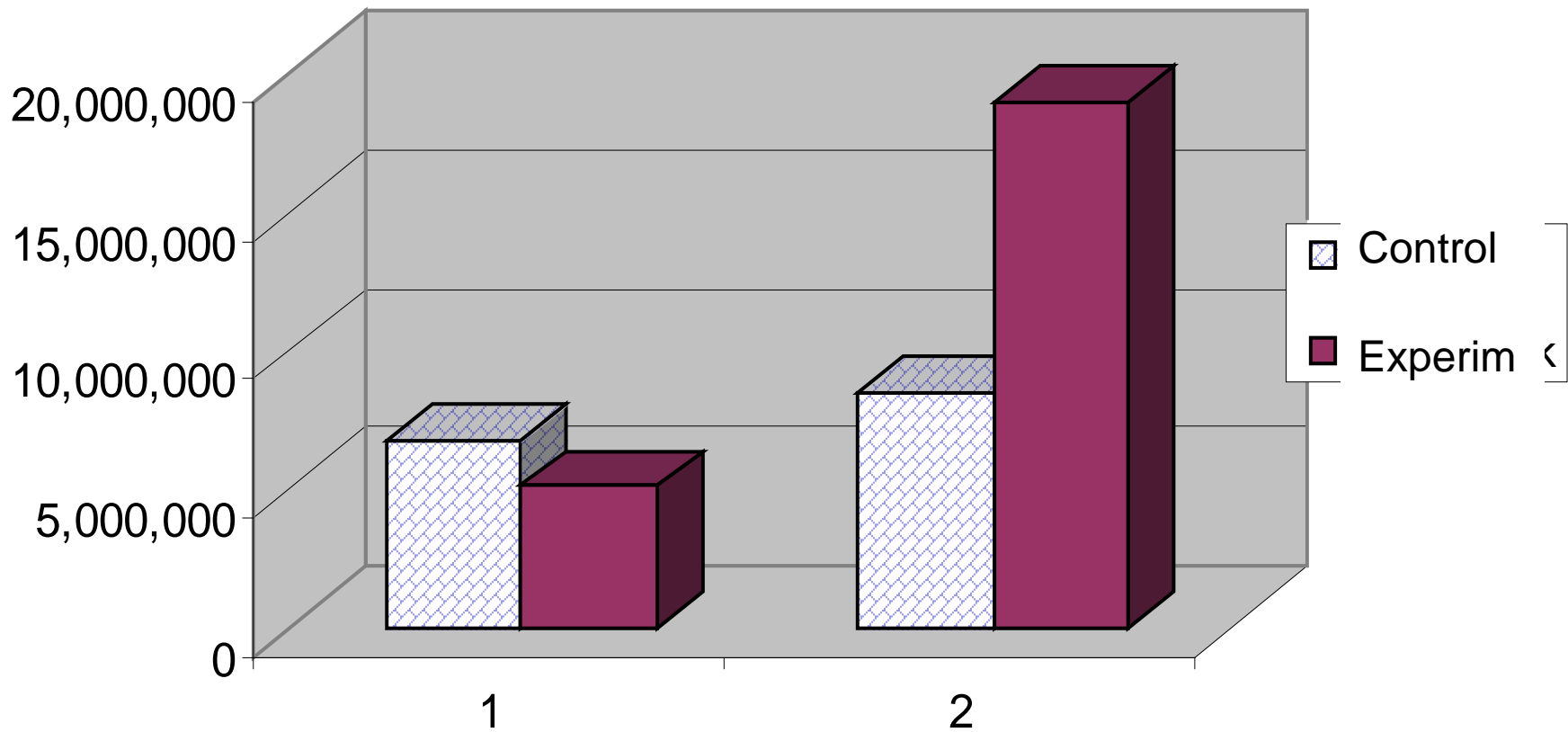
Brood temperature





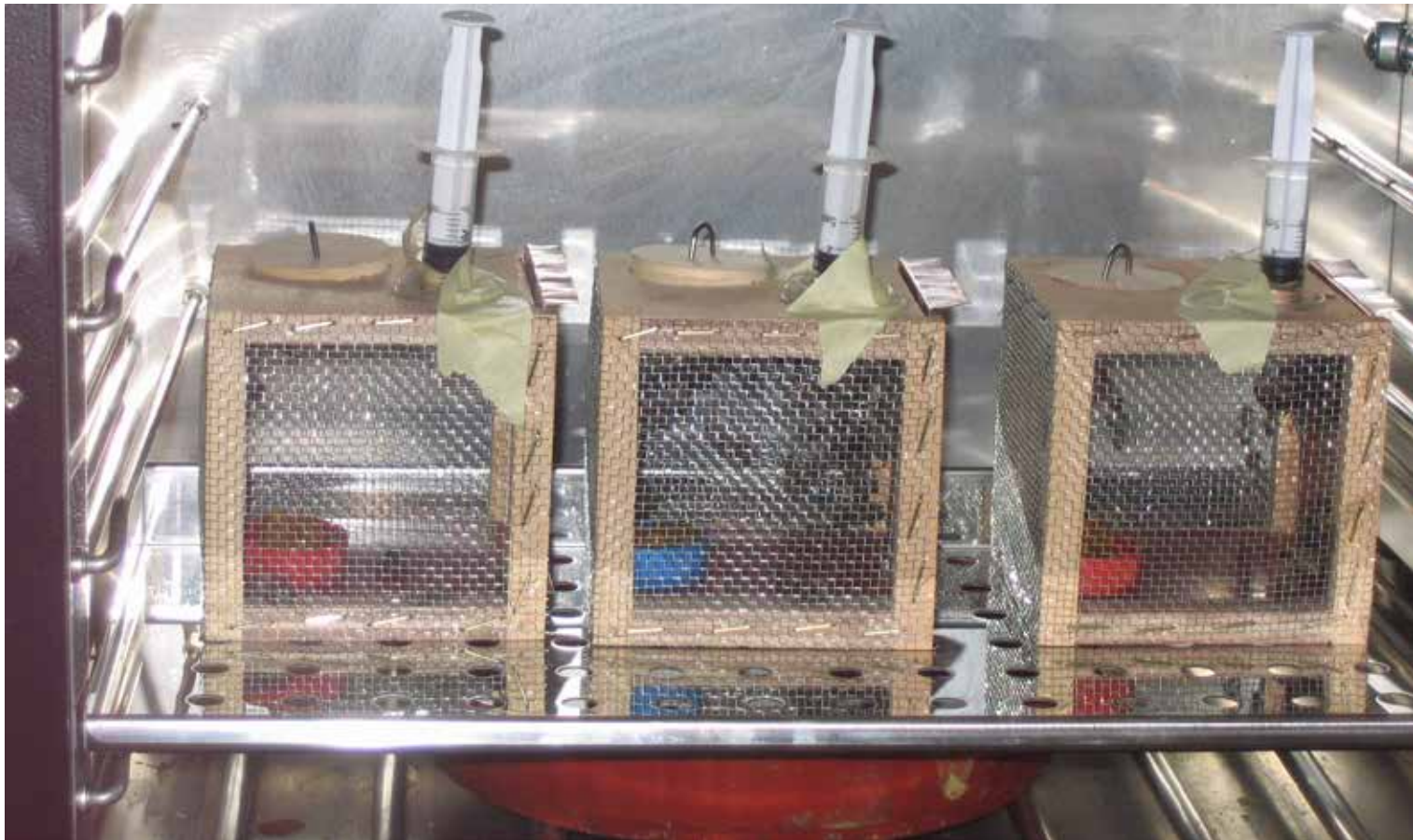
Nosema spores

Σπόρια Νοσεμίας





Laboratory cages' tests



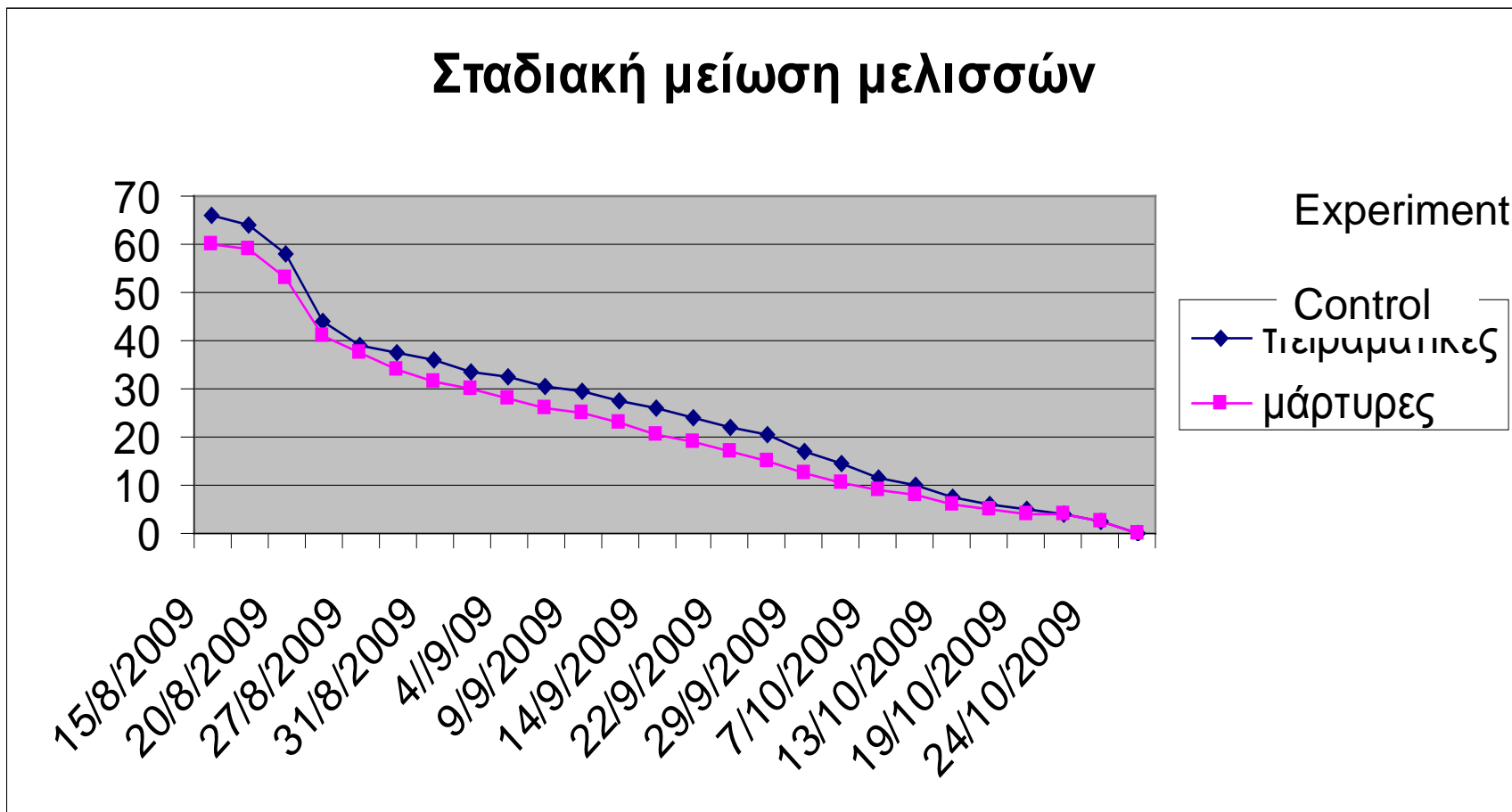


Methodology

- Imidacloprid was administered in concentrations of 2ppb for syrup and 3 ppb for pollen
- Pollen was weighted and sugar solution was measured and changed after two or three days
- Dead bees were removed and counted
- At day 9 and 13 bees were collected and the hypopharyngeal glands were measured



Life span of adult bees



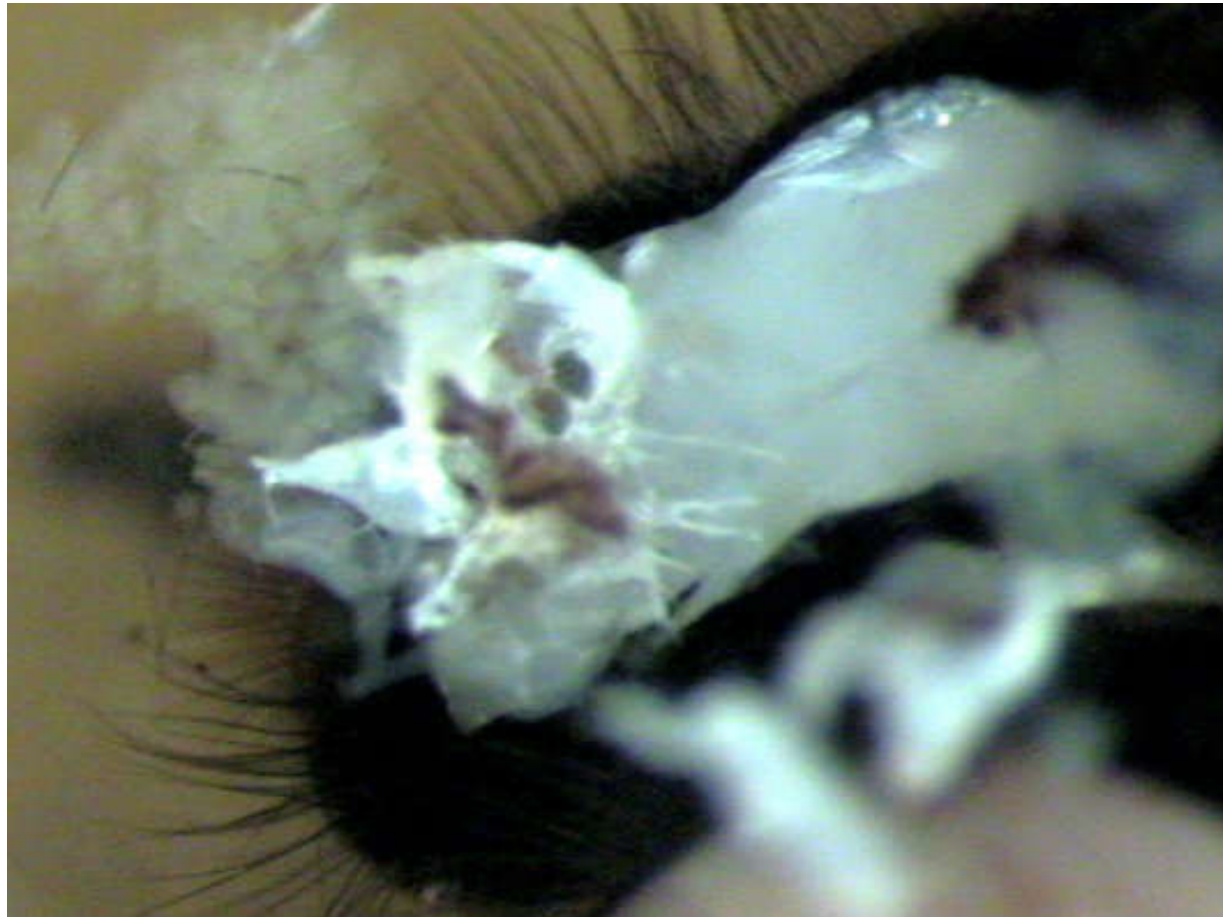


Respiratory rythm

- Giving imidacloprid in sub-lethal doses
- Reduces the contraction of the muscles responsible for the respiration,
- Reduces the respiration rhythm..

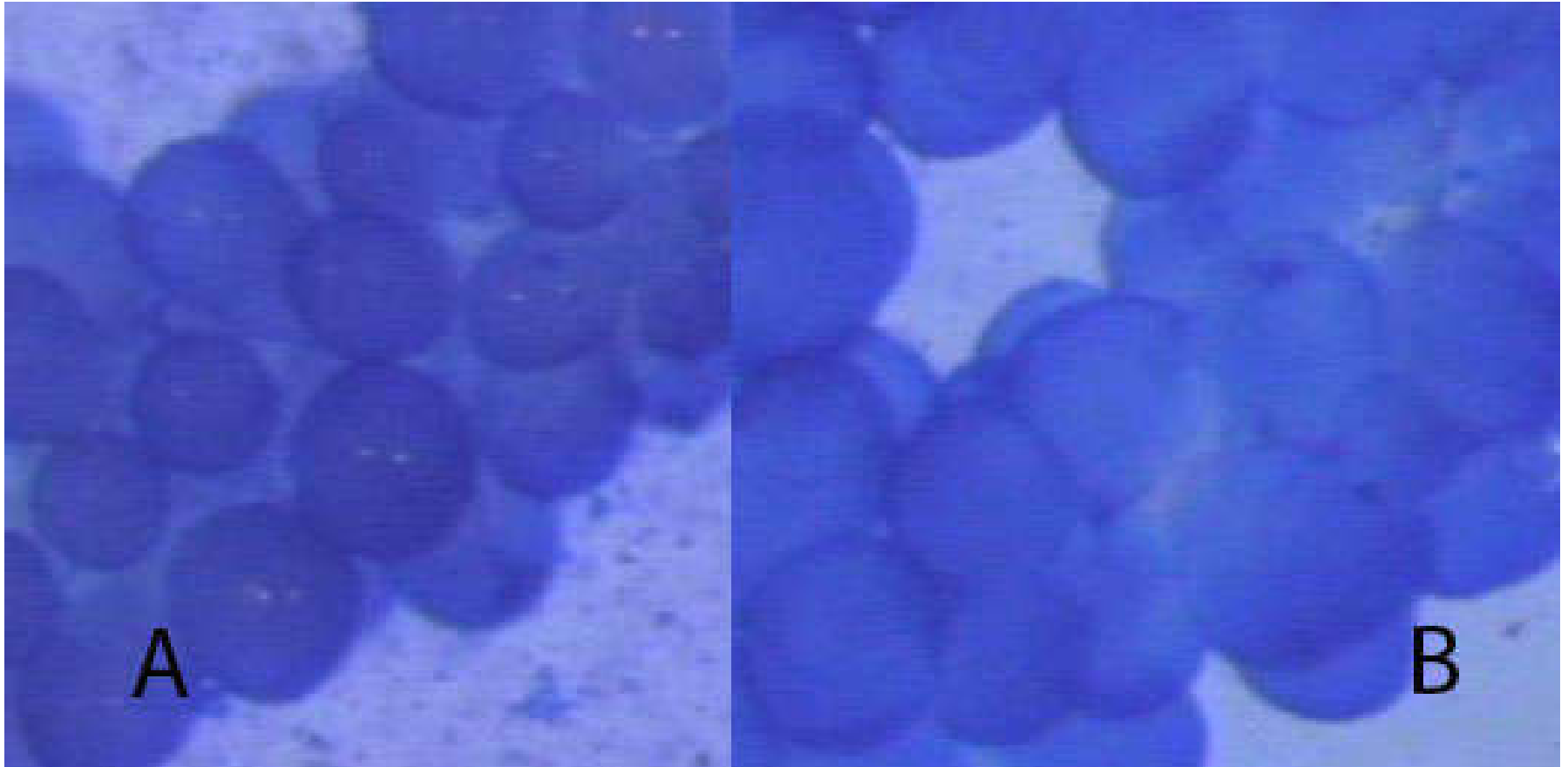


Hypopharyngeal Glands



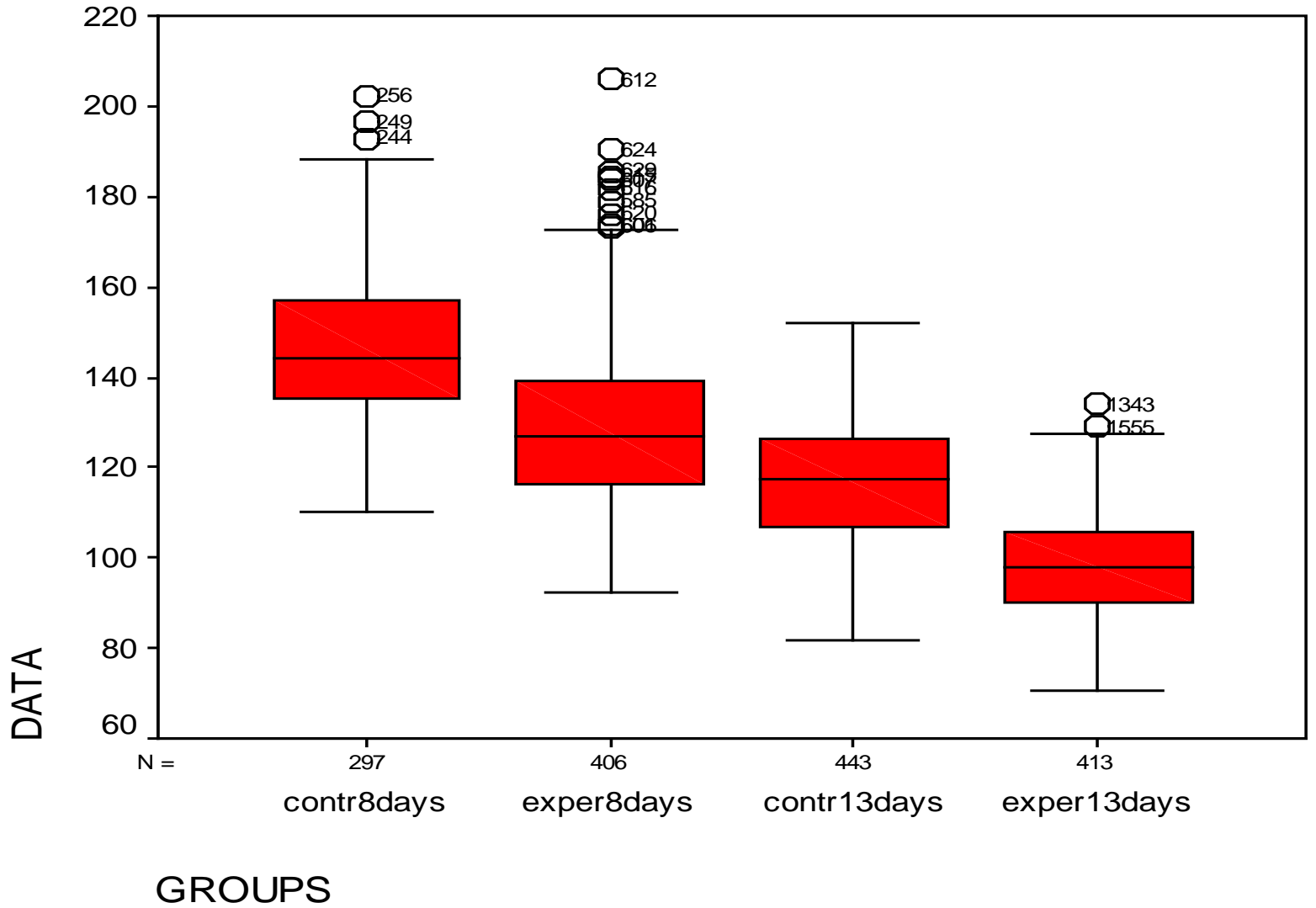


Honey bees 9 days old



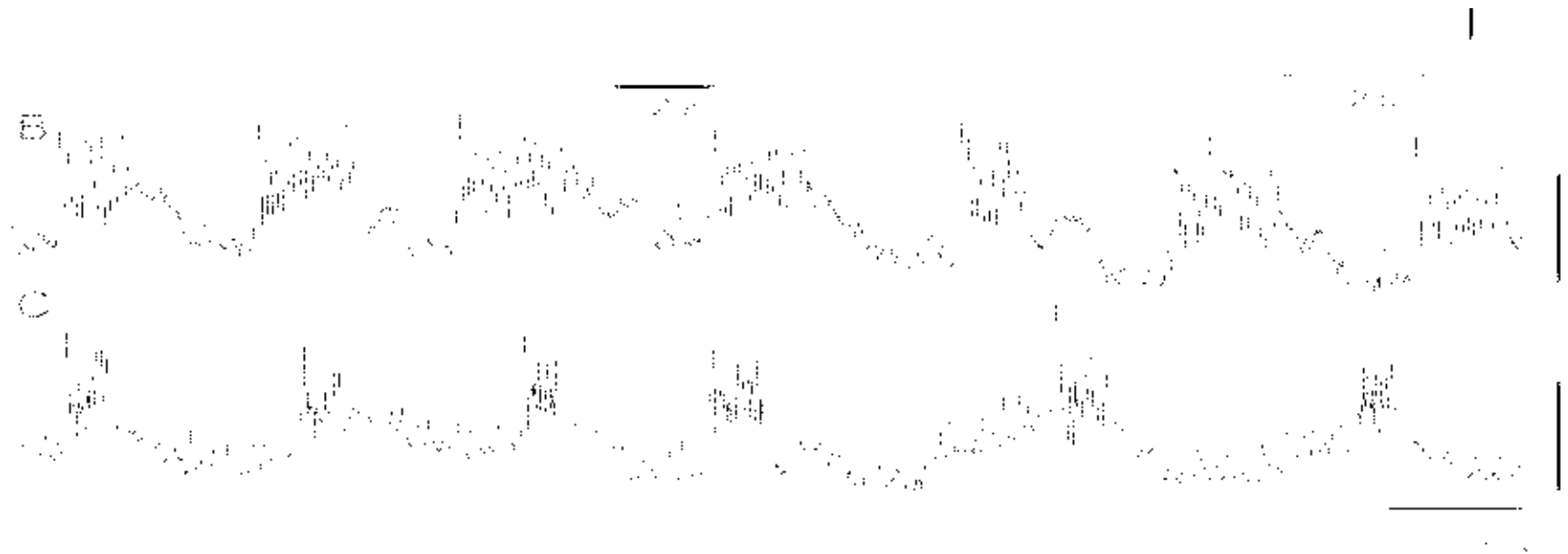
Imidacloprid

Control





Respiration rythm



n B= control

n C= imidacloprid



proboscis extention reflex



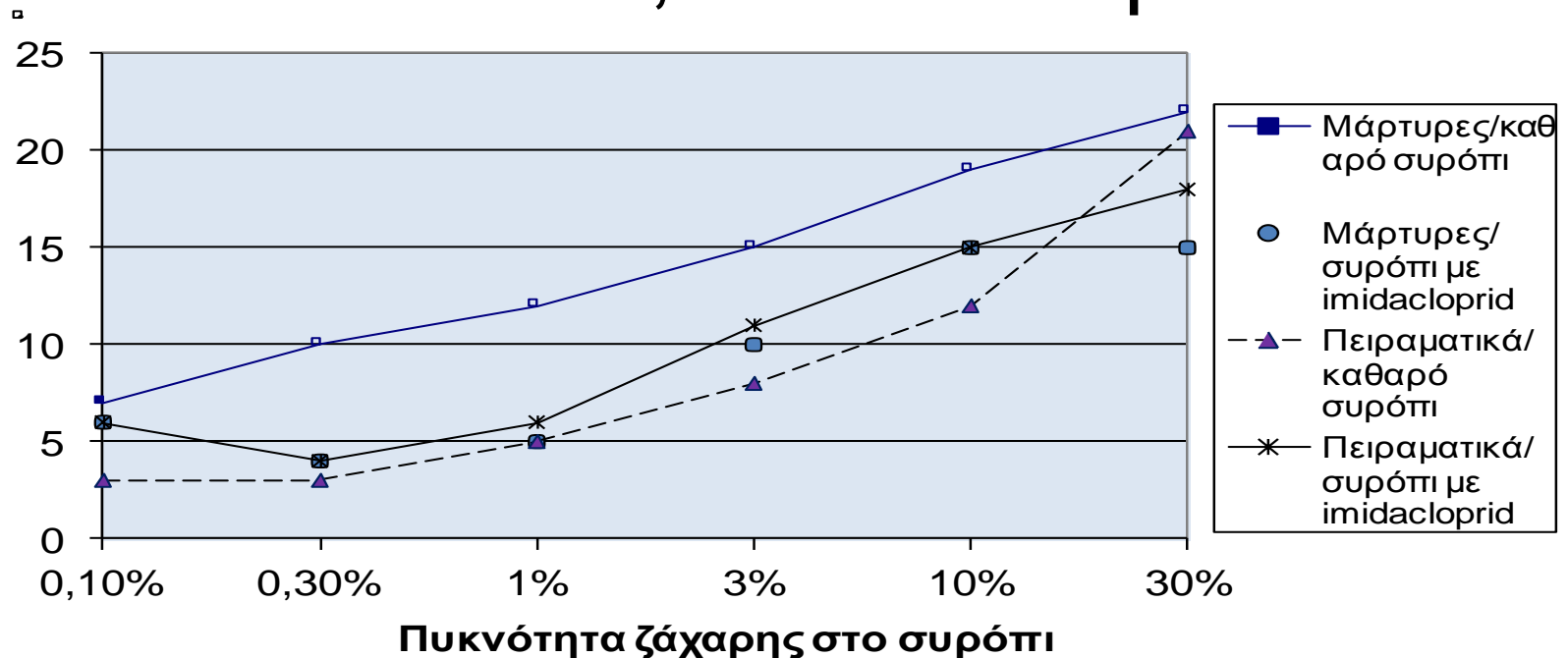


proboscis extension reflex





Bees given imidacloprid show reduced ability of recognition of sugar solutions, so low responses





Conclusions

- Imidacloprid and in general the neonicotinoids do not show a direct effect on the life or development of the honey bee or the colony
- However, there is a reduction on the function of important physiological systems, such as the respiration, circulation, nervous and gland system.



Thank you
for your
attention