# Temperature monitoring of a bee colony during summer period

M. Veca[1] and F.M. Tangorra[2]

[1] Bee Keeper Technician, Apicoltura Veca (Milan-Italy)
[2] Department of Veterinary Science and Technology for Food Safety, University of Milan, Italy

## Introduction

During treatments with evaporating products (thymol, formic acid) used against *Varroa destructor* the temperature inside the beehives plays a key role.
Aim of the study was to evaluate as the bees behavior in thermoregulation activity and building materials of beehives affect the inside temperature of beehives during summer periods.

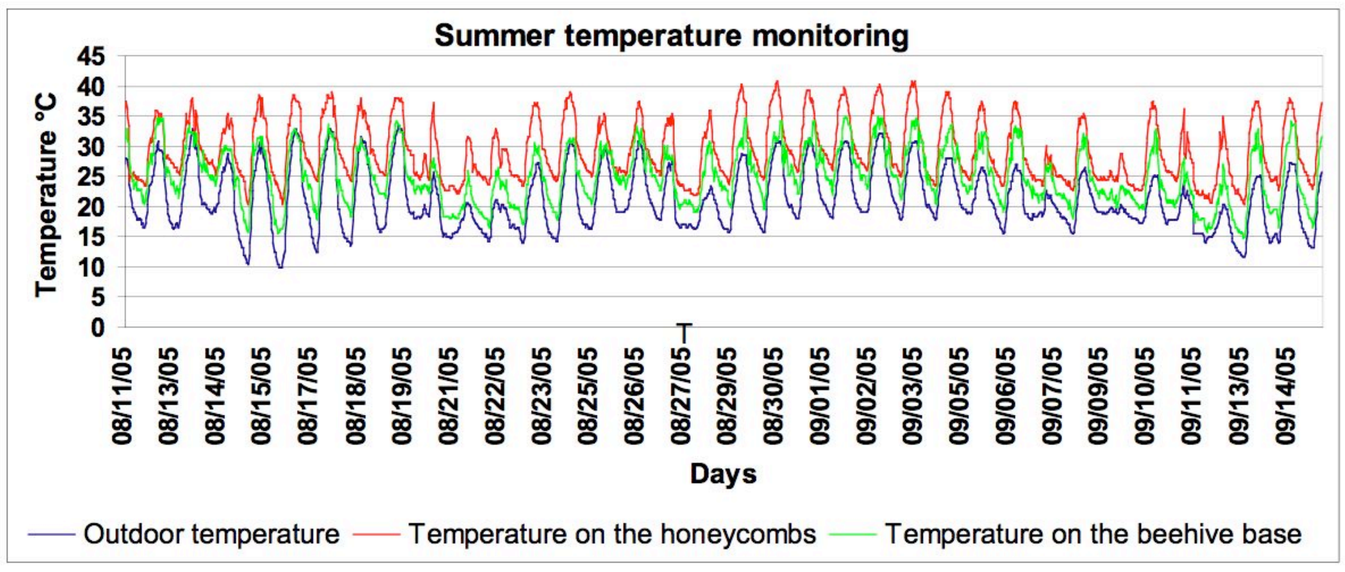
## Material and methods

The temperature inside a family of *Apis mellifera* subjected to treatment with a commercial based thymol product was recorded hourly for 5 consecutive weeks during summertime (August-September 2006) in a apiary of Northern Italy, using a data logger and temperature sensors placed inside the beehive in the following positions: on the honeycombs; on the beehive base; between the brood frames; between the last honeycomb and the lateral wall of the beehive (Figure 1).

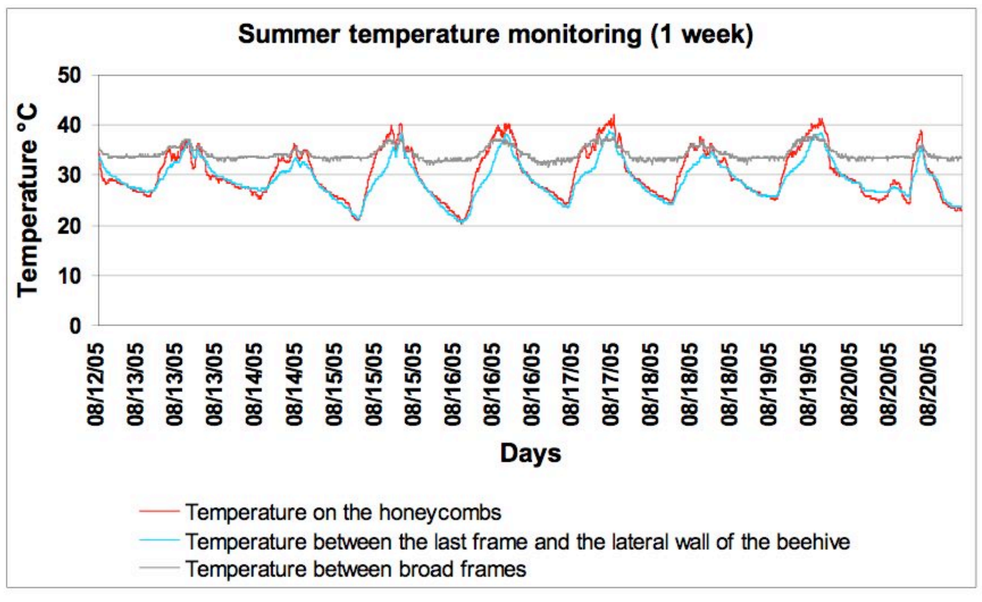

**Figure 1.** Data logger and temperature sensors placed inside the beehive on the honeycombs, on the beehive base, between the brood frames and between the last honeycomb and the lateral wall of the beehive

## Results

Temperature recorded on the honeycombs, near the tray containing the based thymol product, reached a maximum value of 40,6 °C in the hours of maximum sunstroke and a minimum value of 20,2 °C during the night when the external temperature was lower than 10 °C. Similar results were recorded by the temperature sensor placed between the last honeycomb and the lateral wall of the beehive. As well-know only between brood frames minimum range temperature were recorded and the daily average temperature was between 34 °C and 36 °C.




| Temperature (°C) | | 1st Week | 2nd Week | 3rd Week | 4th Week | 5th Week |
|---|---|---|---|---|---|---|
| Average | Outdoor | 22,00 | 20,21 | 21,91 | 22,62 | 18,91 |
| | On the honeycombs | 29,89 | 28,92 | 29,88 | 30,19 | 27,28 |
| Minimum | Outdoor | 9,82 | 13,32 | 15,62 | 15,23 | 11,38 |
| | On the honeycombs | 20,19 | 22,09 | 21,71 | 23,24 | 20,19 |
| Maximum | Outdoor | 32,76 | 33,17 | 31,12 | 31,93 | 27,12 |
| | On the honeycombs | 38,77 | 38,77 | 40,59 | 40,59 | 37,88 |




## Conclusions

Results highlight that bees do not contrast daily thermal range with the exception of the brood area. This aspect is of practical importance for beekeepers considering that evaporating products (thymol, formic acid), usually used against *Varroa destructor*, are applied on the honeycombs where the temperature are affected not only by external ones but also by bees thermoregulation activity on brood area, solar irradiation and building materials of beehives. Therefore, a better insulation of beehives should be realized in order to have minimum thermal range and maximizing the effect of evaporating products.