



Winter cluster temperature monitoring to detect queen bee activity

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Introduction

Evaluating the egg deposition activity of the queen bee is important to decide the right moment of intervention against Varroa destructor whose reproduction cycle stop in the absence of the brood. Each treatment against mites produce the maximum effect if inside beehives there are mites exposed to the action of the molecule used, supposing the absence absence absence of a receptive brood.

Aim of the study was to the verify the beginning of the egg deposition operated by the queen bee after the winter interruption typical of the continental climate area, through the monitoring of the beehive inner temperature trend.

Material and methods

Beehive inner temperature were monitored through a data logger and two temperature sensors placed inside the beehive, respectively in and out of the winter cluster (Figures 1, 2 and 3). One temperature sensor placed outside the beehive completed the data acquisition system.

Temperature monitoring started January the first and ended after 41 days. Over the experimental period temperature were recorded by each sensor every 30 minutes.

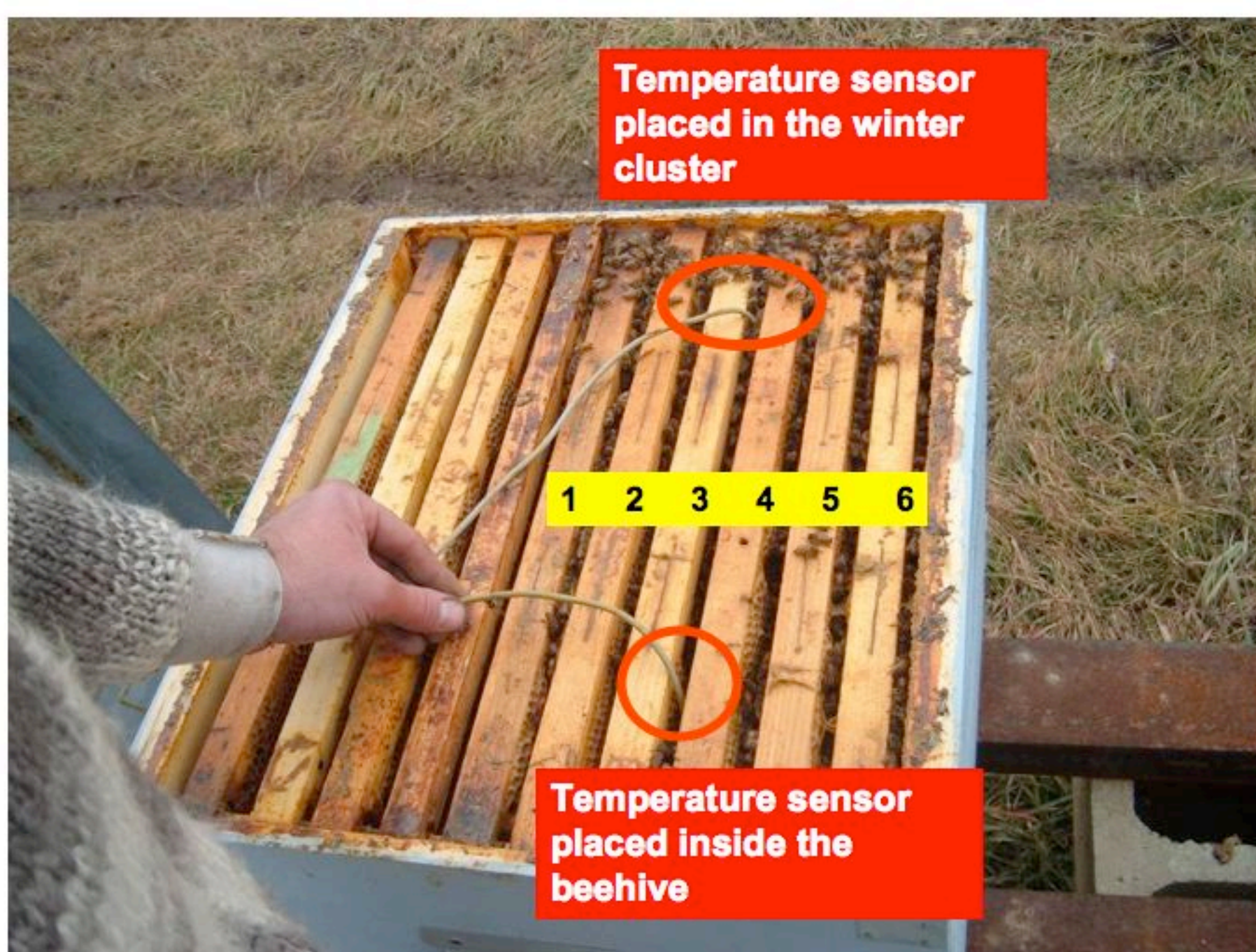


Figure 1. Temperature sensors placed inside the bee colony arranged on 6 frames



Figure 2. Frame number 3: right side



Figure 3. Frame number 4: left side

Results

External temperature ranged between $-11,1\text{ }^{\circ}\text{C}$ and $11,0\text{ }^{\circ}\text{C}$ with an average value of $-1,3\text{ }^{\circ}\text{C}$.

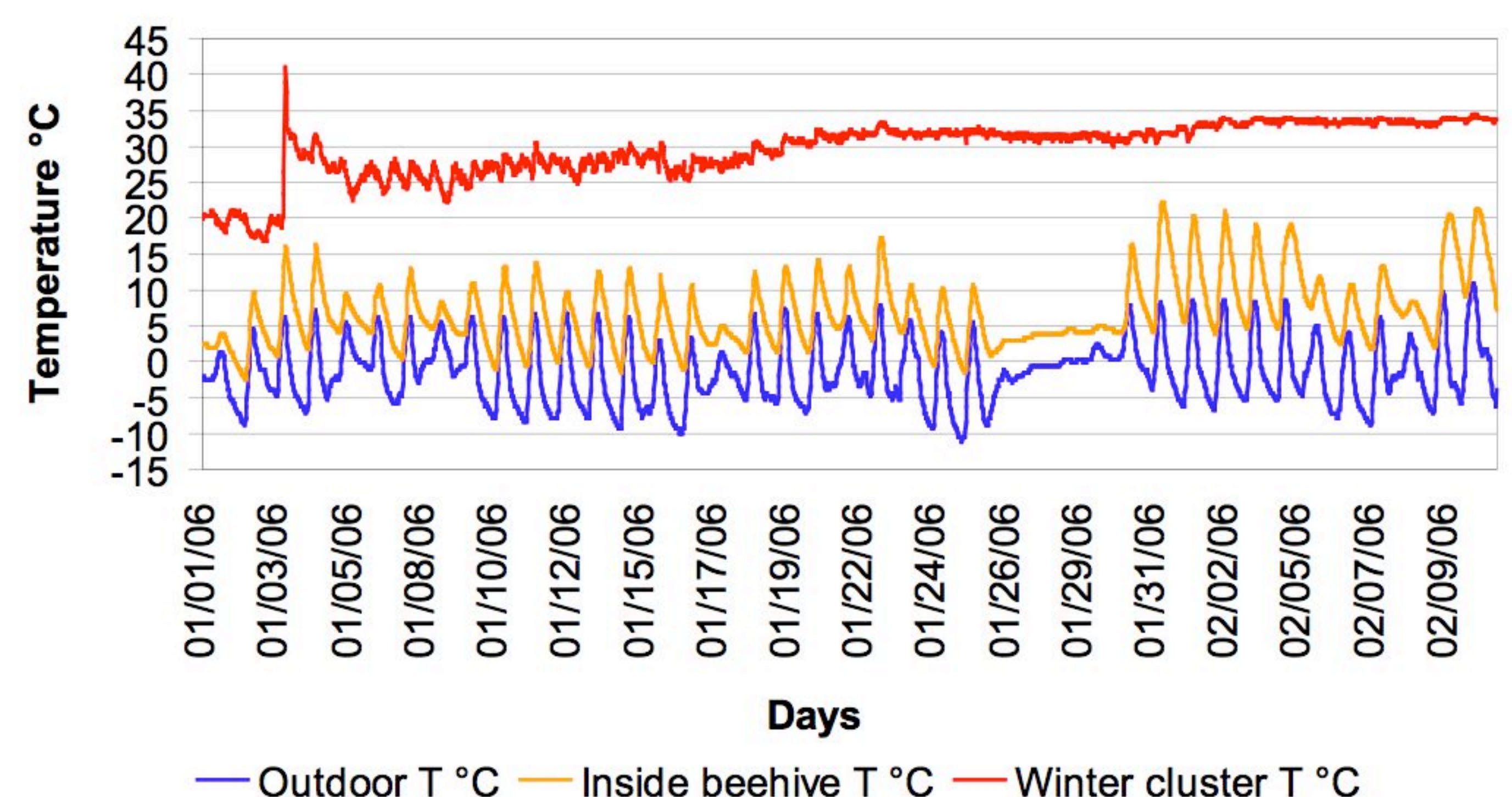
Inside the beehive temperature ranged between $-2,4\text{ }^{\circ}\text{C}$ and $22,1\text{ }^{\circ}\text{C}$ with an average value of $6,8\text{ }^{\circ}\text{C}$.

Inside the winter cluster temperature showed minimum fluctuations during the first three days of experimentation with an average value of $20,0\text{ }^{\circ}\text{C}$. A sudden temperature increase up to $41,0\text{ }^{\circ}\text{C}$ was recorded at the fourth day as consequence of the beginning of the egg deposition activity operated by the queen bee and of the need to heat the new brood. After the fourth day a gradual increase of the temperature was recorded up to $34,0\text{ }^{\circ}\text{C}$ at the end of the experimentation with a reduction of temperature fluctuations as a consequence of the brood building up.

Conclusions

The egg deposition activity operated by the queen bee does not seem to be influenced by outdoor temperature.

Winter temperature monitoring



Temperature ($^{\circ}\text{C}$)	Outdoor	Inside beehive	Winter cluster
Maximum	10,99	22,09	41,05
Minimum	-11,13	-2,44	16,76
Average	-1,32	6,79	29,59