



Nosema ceranae impact on Franche-Comté (north east of France) beehives during 2008



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Contexte

As Franche-Comté Beekeepers were facing high winter losses (50%), beehives stagnation and collapse, the ADA-FC decided to make a survey concerning the hives *Nosema* infestation level into different parts of the region.

Objet of the survey

Study the implication of *Nosema* into the stagnation or collapse of the

Protocol

Per beekeeper, two types of samples are collected: weak hives (non productive) and strong hives (productive).

Number of bees per sample: 100 bees.

Considering that the *Nosema* spores are more numerous into adult bees, than young bees, and that beehives stagnation is characterised by a foragers shortage, only foragers are collected at the entrance of the hives.

Bees are sended alive to the Departemental Analysis Laboratory of Jura (LDA 39) for numeration according to the EIO (Epizootic International Office) modified technique. The characterisation between Zander and Ceranea, by PCR, was realised by the National Center of Scientific Research (CNRS - Clermont-Ferrand).

- ✓ Identification and counting of *Nosema* spores
- ✓ Interlinking between infestation level, beekeeping practices and colonies strength

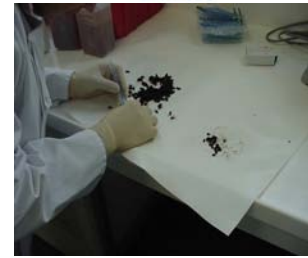


Photo LDA 39

Size of the survey

42 samples collected and analysed

12 beekeepers

- 2 in the Doubs
- 4 in Haute-Saône
- 6 in the Jura

Results

Nb of spores per bee (in million)	Weak colonies (million of spores/bee)	Productive colonies (million of spores/bee)
< 0,1	0,05	0,02
0,1 à 5	2,07	2,36
5 à 10	5,41	

Table 1. Average infestation level in each range.

	Weak colonies (million of spores/bee)	Productive colonies (million of spores/bee)
Minimum	0,01	0
Maximum	5,65	4,77
Average	2,15	2,11

Table 4. Minimum, maximum and average bees infestation level according to the strength of the colonies.



Photo LDA 39

Nb of spores per bee (in million)	Weak colonies		Productive colonies	
	Nb of samples	%	Nb of samples	%
< 0,1	2	8,7	2	10,5
0,1 à 5	19	82,6	17	89,5
5 à 10	2	8,7	0	

Table 2. Samples distribution per infestation range.

	Acetic acid	Thyme essential oil	Protophyll	Apiherb
Weak colonies (million of spores/bee)	4,57	0,01	-	1,38
Productive colonies (million of spores/bee)	1,78	0,04	4,18	-

Table 3. Spring added feeding and infestation level.

First conclusion at mid june

39 samples are *Nosema ceranae*.
2 samples are *Nosema ceranae* + *Nosema apis* Zander.
1 sample has no *Nosema*.

- ✓ The analysed livestock shows different infestation levels, between beekeepers and inside each health situation category.
- ✓ 6 beekeepers show maximum infestation levels into weak colonies and 5 into strong colonies.
- ✓ The average infestation level of weak and strong hives is quasi identical.
- ✓ Beehives distribution according to the infestation level is almost similar in the two categories.
- ✓ There is no relation between winter losses and infestation level.
- ✓ Thymol treatment against Varroa has no impact on infestation level, as for the added syrup.



Photo LDA 39

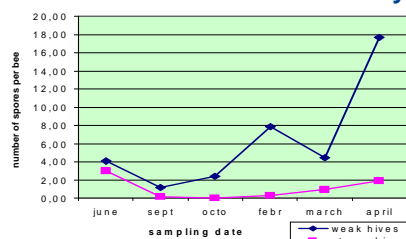
Spring added feeding and infestation level (7 samples)

Impacts on spores infestation isn't, inspite of positive observations, related concerning beehives dynamism.

Attention, the number of samples is too small to be representative and allow conclusions.

Thyme essential oil administration, can't be considered as having a lowering infestation action, because other hives of the same beekeeper which didn't benefit of such feeding show very few or zero spores.

Infestation evolution over one year



Infestation evolution from mid june 2008 till april 2009.

Following the first survey, ADA-FC studied the infestation evolution on 4 weak and 5 strong hives till april 2009.

2 weak and 1 strong hives died in spring 2009.
2 weak hives in june 2008 made honey in 2009.

Chart 5 shows the weak hives infestation level increases during autumn 2008 and spring 2009.

Strong hives sample shows a strong decrease in autumn, a low infestation level in winter and an increase in spring to a similar level as mid june 2008.

Photo LDA 39

