

## Results of the survey run from 2004 to 2006 in Belgium

Bach Kim Nguyen, Eric Haubruge  
Department of functional and evolutionary Entomology, Gembloux Agricultural University  
B-5030 Gembloux (Belgium) ([haubruge@fsagx.ac.be](mailto:haubruge@fsagx.ac.be))

### Introduction

For several years, abnormal high death rate and weakening of honeybee (*Apis mellifera* L.) have been very often observed in South Belgium. A great number of factors are likely to influence its vitality. There are causes inherent to the agricultural sector (e.g. pesticides, lack of knowledge), to private individuals (e.g. pesticides), to environment (e.g. temperature, nutritive resources), to industries (local pollution) and to the apiarian sector (e.g. pesticides, pathologies, lack of knowledge). Then, a multifactorial study in Wallonia was set up in order to discover the risk factors which are likely to influence the vitality of the bees in Belgium.

### Field Work

#### A. Questionnaire (2004 – 2005)

- 55 questions asked and explained by a department member
- Personal data: name, address, phone number, mail
- Location of the apiaries: address, GPS localization
- Description of the apiaries: highest number of colonies, apicultural practices
- Colony losses : number, period, symptoms
- Honey production

#### B. Survey (2004 – 2006)

- 16 beekeepers, 3 hives per apiaries (48 hives in total)
- 4 visits per year. Every one of the 48 hives was examined at each visit
- Pollen, honey, adult and brood population was recorded
- Symptoms and anomalies recorded
- Apicultural practices
- Samples
  - bees
  - brood
  - wax
  - honey
- Determination of each field occupation and various crop area on 36 km<sup>2</sup> around the apiaries.
- Determination of the corn fields treated with imidacloprid on 36 km<sup>2</sup> around the apiaries
- Laboratory analysis (microscopic, molecular, HPLC, GC-MS/MS, LC/MS/MS)
  - diseases (Nosema, AFB, EFB, etc.)
  - Chemical residues
- The results are refined the last year by the follow-up of 15 other apiaries

### Results

The observed average mortality rate of colonies was estimated at 17,49% in Wallonia ranging to 0 to 84%. The months during which the higher mortality rate were February and March (78,57% of the mortality cases) and between November and January (14,29% of the

mortality cases). However, since this date of highest mortality does not necessarily correspond to the date to which the colony collapsed and, since 59,52% of the apiaries were not observed during winter, we can think that most cases of mortality happened between november and March without being able to give a precise date (Fig. 1).

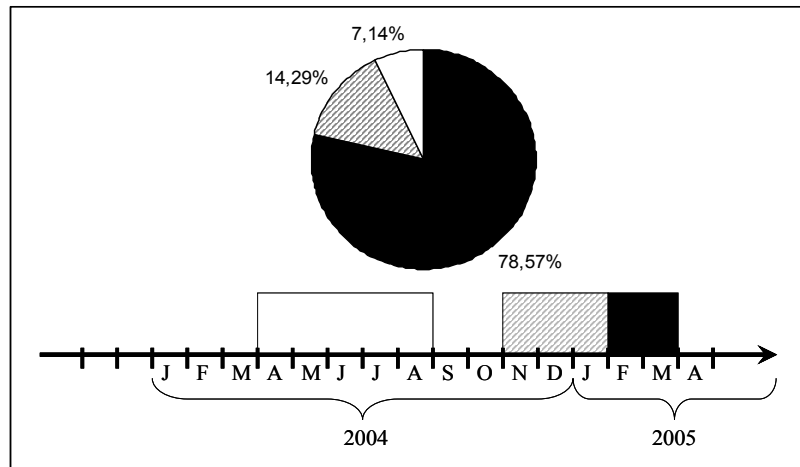


Figure 1.

The questionnaire and the visits enabled us to count the various chemical treatments employed to fight against *Varroa destructor*. Eight active biocids are found. The statistical analysis revealed an influence of the chemical treatments on the death rates (Fig 2.).

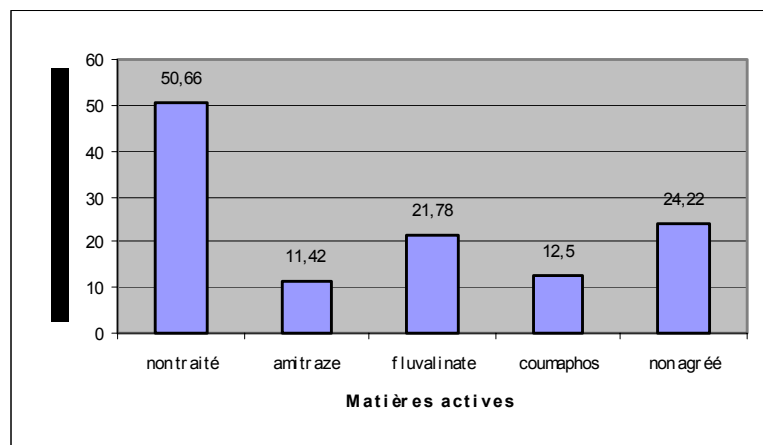


Figure 2.

About the survey, a range of 15 pathologies were detected in colonies. We analyzed 595 samples and 18 pesticides were found in hives. Imidacloprid was detected in 5 samples and no correlation with mortality rates and pesticide residues was observed. Moreover, no correlation was observed with the corn field surface treated with imidacloprid and bee colony collapses

In our study, the multifactorial statistic analysis (Stepwise) showed an influence of varroase, american foulbrood and quantity of food during the winter on the honeybee mortality.

We do currently new multifactorial researches (2007-2008) in order to study especially the impact of the viruses and the nutritive resources in the bee colony collapse.

### **Advantages and disadvantages of this method:**

#### Advantages:

- Reliable data are directly taken from the field
- Objectivity of the questionnaire asked to beekeepers
- Pesticides and diseases are well estimated

#### Disadvantages:

- Difficulty to study all the risk factors in the same time
- Introduction of the data in the computer is labor intensive
- Expensive cost of the chemical analysis (pesticides residues)

### **Final report (2004-2006) :**

[http://www.fusaqx.be/zq/Recherche/Exposé\\_Rapportfinal.pdf](http://www.fusaqx.be/zq/Recherche/Exposé_Rapportfinal.pdf)