Breeding Varroa Tolerant Honey Bee (*Apis mellifera iberiensis*)

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INTRODUCTION:

Varroa destructor **is a dangerous pest for west beekeeping. Many researchers are working searching Varroa tolerant honey bees. Some of them breeding bees for specific traits fighting against Varroa. For example, the low reproductive success of the mite in SMR honey bees (actually known as VSH) (Harbor and Hoopingarner, 1997; Harbor and Harris, 1999; Harris and Harbor, 2005). In other way, some authors support their research more directly on the natural selection, allowing the survival of colonies that self defended against the mite in untreated apiaries (Kefuss *et al.,* 2004; Le Conte , 2004 or Fries *et al.*, 2006). In this research, we keep an untreated apiary from March, 2007. We register Varroa population by natural fallen of mites on the bottom board and finally, we studied some reproductive parameters about varroa reproduction in survival bees colonies.**

MATERIALS AND METHOD:

In March, 2007 were established an experimental apiary. Sixty five colonies from different source were housed in Langnstroth beehives, supply with a wire-screen mesh (3x3 mm). Each colony was formed by 7 combs with adult bees (five brood combs and two honey and pollen combs) other three founded combs were added.
We prioritized the survival of the untreated colonies. They were theses colonies that tolerated the autumn increase of Varroa population or they avoided the increase of mite population, survival the winter and developed as a treated colony in spring of 2008.
Along of the beekeeping season we registered natural mite fallen on a botton-boards of the beehives in periods of 4 days (Flores *et al*., 2002). The study of the reproductive success in survival colonies was carried out in February of 2008. We select from each of them a sealed worker brood comb, that coincides with the 7-8 days after capping (Rembold *et al*., 1980). The brood combs were inspected under a binocular glass magnifying (X 20). From each colony we examined a maximum of 20 parasited cells or up to 200 cells with breeding of appropriate age, when the parasitation was lower. As a result of this evaluation the following data was recorded:
- Percentage of parasitized brood (cells parasited with respect to the total number of examined cells).
- Number of cells infested by only one foundress.
- Number of viable reproductive parasites that haven't had reproductive success. In agreement with Harbor and Harris (1999) Varroa has not reproductive success if: I) varroa died in the cell without reproducing, II) when the mite is infertile, III) when the offspring are only male and IV) when the offspring is too late to reach the maturity before the postcapping period is finished.

RESULTS AND DISCUSSION:

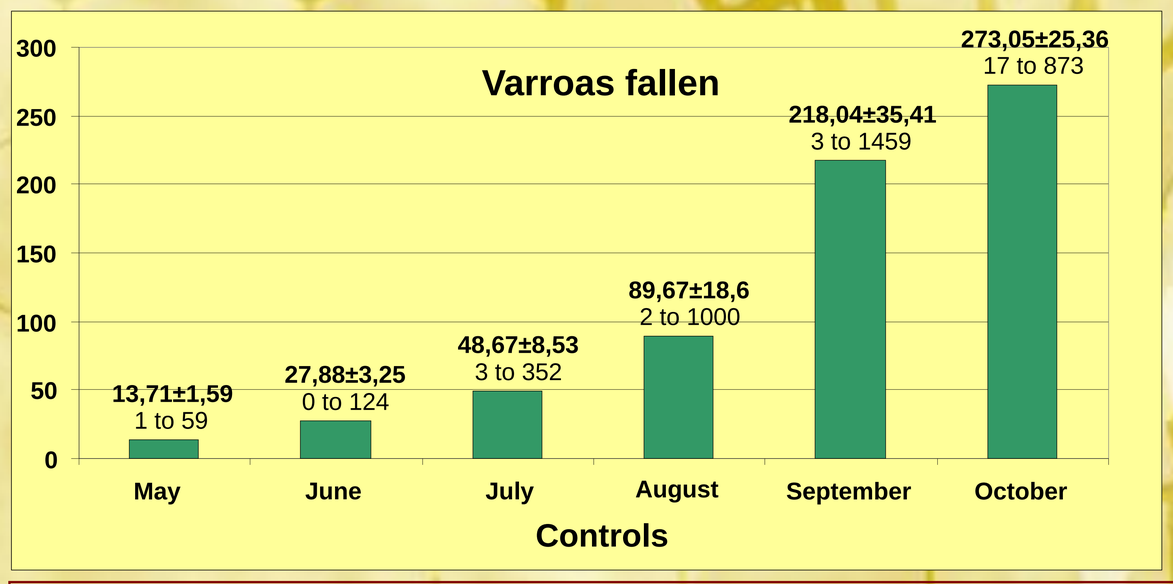

Figure 1. Natural Varroa dropping on the bottom-board in six controls (65 colonies). Data are showed as mean ± s.e, minimum and maximum.

Colonies 1 to 6 were lower parasited than the mean, but only colonies 1, 2 and 3 showed higher lack of the Varroa reproductive success. In the other side, colonies 6 to 9 had a percentage of parasitation higher than the mean. These colonies showed low and high lack of reproductive success of Varroa but, instead these data were higher than the data obtained in colonies 4 to 6.
Results seem to show that not only the lack of Varroa reproductive success can produce low infestation of the colonies.
Nevertheless, although some colonies tolerate high percentage of parasitation, we think that these colonies are exposed to the risk that an unbalanced condition can produce the collapse. Therefore we think that only low parasited colonies should be selected for breeding.

The mean of Varroa population increased along the experiment, searching high values (fig. 1) and killing many colonies in November and December. But, the more important result is that survival nine of 65 colonies (13.85 %). These results are in agreement with others authors with similar research (Fries *et al.,* 2006). Almost of survival colonies overwinter in good conditions, developing the bee population in spring, place super and were artificially swarmed. This colonies are especially important since they survival in an apiary with very high Varroa population and where the re-infestation were high and permanent.
We show on table I the percentage of the bee brood infestation from survival colonies and the reproductive success of Varroa in these colonies.

Colonies	Opened cells with pupae 7-9 days after capping	Number of infested cells	Number of infested cells with only one mite foundress	Percentage of parasitation	Percentage of Varroa without reproductive success
1	200	2	2	1,00 %	50,00 %
2	200	4	3	2,00 %	66,67 %
3	205	7	7	3,41 %	57,14 %
4	200	9	9	4,50 %	11,11 %
5	210	10	8	4,76 %	12,50 %
6	200	10	8	5,00 %	12,50 %
7	200	14	12	7,00 %	41,67 %
8	169	20	15	11,83 %	20,00 %
9	131	20	17	15,27 %	47,06 %
Mean ± s.e.				6.09±1.55	35.41± 7.18

Table I. Percentage of infestation in worker honey bee brood from 9 colonies that survival in an untreated apiary and lack of reproductive success of Varroa in these colonies (Data are showed versus cells infested only with one foundress).

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